THE AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY

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The Australian and New Zealand Journal of Surgery

JULY, 1945.

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JACKSONIAN PRIZE.

THE Council of the Royal Australasian College of Surgeons has been advised by the Council of the Royal College of Surgeons of Engiand that the subject chosen for the Jacksonian Prize for the year 1946 is "Traumatic Aneurysm". Full details governing the conditions of the prize may be obtained from the Secretary of the Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1.

The University of Adelaide.

SHORNEY PRIZE.

THE Shorney Prize, established for the purpose of perpetuating the memory of the late Herbert Frank Shorney, M.D., F.R.C.S., Lecturer in Ophthalmology in the University of Adelaide from 1926 to 1933, will be offered for the first time in 1946.

The relevant clauses of the statute are as follows:

3. A post-graduate prize, to be called the Shorney Prize, of the value of £100, shall be awarded to the candidate who in the opinion of the examiners has made the most substantial contribution to knowledge in the subjects of ophthalmology or of diseases of the ear, nose and throat.

4. The recipient must be a graduate of an Australian University.

5. The material submitted for the prize may be either a thesis or published work in medical or scientific literature.

6. Each candidate must declare that the work described is his own.

7. The prize shall be offered for competition from time to time as the accumulations of the fund permit.

8. The prize shall be offered at least twelve months before the last day for the receipt of applications.

9. The prize shall not be awarded on any occasion unless in the opinion of the examiners the material submitted is of sufficient merit.

Applications, accompanied by the evidence which the candidates wish to submit in support, must reach the Registrar of the University of Adelaide not later than June 30, 1946.

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ALL articles submitted for publication in this journal must be typewritten and double or treble spacing should be used. Each article should conclude with a brief summary and statement of conclusions. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

Authors are requested to submit two typescript copies of all articles.

References to articles and books should be carefully checked. In a reference the following information should be given without any abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given, with full date in each instance.

When illustrations are required, good photographic prints on glossy gaslight paper should be submitted. Line drawings, charts, graphs and so forth should be drawn on thick white paper in indian ink. Authors who are not accustomed to prepare drawings of this kind, are invited to seek the advice of the Editor if they are in any doubt as to the correct procedure. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available.

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THE GEORGE ADLINGTON SYME ORATION.[1]

THE UNIVERSITY AND THE MEDICAL PROFESSION.

By J. D. G. MEDLEY,
Vice-Chancellor, University of Melbourne.

I HAVE a weak-minded habit, when preparing for a task such as that which confronts me this evening, of being unable to make a start upon much thinking or any writing until I have found a satisfactory title. When you did me the signal honour of inviting me to deliver the Syme Oration for this year, there immediately insinuated itself into my head the old nursery jingle, used for divining the future by cherry stones, which begins, as you will all remember, "Tinker, Tailor" and ends "Gentleman, 'Pothecary, Ploughboy, Thief". I wish I had been brave enough to stick to my first impulse which was to take as my title simply "Gentleman?, 'Pothecary??". But I felt, on reflection, that, during the interval that must necessarily elapse between the publication of the title and the delivery of my oration, some at all events of my prospective audience might come to the conclusion that I regarded the two professions mentioned as mutually exclusive alternatives. No prudent orator—and I suppose this applies to surgeons as well—will run the risk of alienating the sympathies of his audience before he starts operating upon them—what happens after he starts is of course another matter—and I rather reluctantly substituted the very pedestrian label which has been recited to you by the President. But I mention the other for, despite its apparent frivolity, it does rather effectively and provocatively convey the essential gist of much of what I propose to say to you. Let me, however, before going any further, thank you sincerely for the compliment you have paid me. I suppose that as a Vice-Chancellor I can pose even before such an audience as this as something more than an intelligent layman. But in effect that is all I am, and I should, I think, thank you not only on my own behalf but on that of all other intelligent laymen for this official and, may I add, unusual recognition of their existence by the most learned of the professions. I am going to take advantage of my laity—and also, I hope, of my intelligence, though the verdict here must lie with you—to speak to you frankly upon certain aspects of professional training which are peculiarly the province of the University and extremely important to the future welfare both of your particular profession and of the community in general. I mean to be inoffensively provocative—if such a combination is possible—and I hope that what I have to say may be thought to have value

[1] Read at the eighteenth annual general meeting of the Royal Australasian College of Surgeons held at Melbourne on May 12, 1945. Accepted for publication on June 15, 1945.

as a contribution to the discussion of some of the problems which beset us, and to be not unworthy of the memory of the distinguished surgeon in whose honour we are gathered here tonight. If at any point I trespass unduly upon your professional domain, I can only remind you that a Vice-Chancellor spends half his time in such trespasses and the other half in being prosecuted for them. And if you think that my picture is painted too exclusively in Melbourne colours, my answer is that by and large our problems are common to all Australasian schools, that our particular attitude towards them may shed some light upon the whole, and that anyway I prefer to discourse upon what I know something—however little—about.

If this were a "documentary" oration, to use the latest jargon, I should start by throwing on the screen the likeness of a streaming banner—a banner simply embroidered with a strange device, the one word "quality". If the picture were really up to date, the banner would be tattered and several letters in the word would be defaced or missing. But I should keep it on the screen, for the idea it embodies underlies all that I want to discuss with you. It is becoming a platitude to say that democracy is a paradise for the second rate and that in this democracy in particular we are in danger of becoming worshippers at the shrine of mediocrity. Like all platitudes, there is truth in it: like all platitudes it repays further investigation. I need not in these surroundings argue the point that the quality of its learned professions is one of the factors upon which the real welfare of any modern community must most essentially depend. But what are the factors which determine this professional quality? Are we in real danger of eroding it whether by ignorance, carelessness or conservatism? These are the questions to which, I fear in very summary and selective fashion, I want to address myself and you. We of this generation must bend all our energies to the mystery of our immediate future. Such mysteries need the highest detective genius for their solution, and there is at least a danger that we are tending to concentrate upon the welfare of our Watsons at the expense of our Sherlock Holmeses. But I abandon this tactless analogy in some haste, remembering that Watson was a surgeon, whilst the original model from whom Holmes was drawn was an Edinburgh physician.

A good discourse should have a text—and I have two. Some little time ago I was rung on the telephone by a man prominent in the councils of the Commonwealth. He wished to know why this University had thrown into outer darkness for the duration of the war a certain number of students who had not survived the horrors of first year medical examinations. I replied, with what courtesy I could compass, that the University was of the opinion that the victims in question were not of a calibre to do themselves or the University any good by remaining at it and that as far as their destined profession was concerned the question was academic inasmuch as there was no chance whatever of their passing the necessary examinations, however hard, long and often they attempted to do so. "Do you realize", was his reply, "that you are sabotaging the desire of the Government to bring the masses to the University?" That is my first text.

My second is derived from a statement in the Press of another State by a lawyer who is also a Senator of a University and a Member of a State Parliament. "The quota system", he said, "is contrary to all justice, for it traverses the inherent right of every boy and girl to come to the University." Now to talk about "masses" and "inherent rights" these days is of course much more fashionable and far less dangerous than to talk about "gentlemen", and it is a startling thought for a Vice-Chancellor that what the begetters of the French Revolution should really have adopted as their slogan was "Liberty, Equality, Fraternity and University". But let me make myself

quite clear. I am talking about quality with special reference to the welfare of a profession. "Masses" and "inherent rights" mean nothing in this connexion. The disconcerting fact is that there are people in power and place who think they do and that alone should put us on our guard. "Gentleman", of course, is a good word gone wrong. In its passage down history it has accumulated barnacles which have done its essential meaning great disservice. But shorn of its snobbish and class trappings, it does connote a certain liberal quality of mind which to me at any rate is a satisfactory expression of the right sort of professional outlook. My meaning will emerge more explicitly as I proceed. For the moment I am concerned only to make clear that my use of my texts should not convict me of unduly class-conscious or reactionary views. I am not talking of "the quality", as Sam Weller and his generation of Victorian servants used the phrase. Quality is not the prerogative of a class: it is in itself not conditioned by economic factors. Environment can and does stimulate or depress it, but my very short experience of the workings of the Dafydd Lewis foundation would have convinced me, if conviction had been needed, that in the search for quality—which is the primary object of that foundation—it is impossible to spread the net too widely. There is always a tendency in times of great social uncertainty for members of close corporations to draw closer together for mutual protection against the blasts from without. Than this, at the present time, there could be no more suicidal policy save one—that of lowering all defences and abandoning all standards in deference to the parrot cries of my texts. Let us, however, cease to concern ourselves with the extremes. There is enough cause for pride and confidence in the dispassionate contemplation of our past and our present to make it quite unnecessary to give way to panic about the future. We have foundations, solid and well laid; a system of secondary education which needs reform, it is true, but is by no means as bad as its critics love to paint it; a University which needs many changes, it is true, but not, I think, a change of heart; and a profession which has, no doubt, some of the defects of all human associations, but can vie with the standards and performances of its rivals anywhere in the world. There is in fact no excuse for despondency. I come to preach not revolution, but common-sense development.

There is between the University and the medical profession a relationship of very peculiar intimacy. The University is the sole gateway leading from the schools to the profession. The profession is a link which directly or indirectly connects the University with many sections of the community it would never otherwise touch. Within the University itself the medical school is a body of a quite particular character and coherence. It consists entirely of full-time students whose work from its earliest stages overlaps very little with that of other schools and brings them into active contact with the raw facts of their destined profession at a period of their development when most other students have still at any rate one foot in Utopia. The medical school in fact has an *esprit de corps* of its own which has some educational disadvantages in that it tends in many cases to isolate its inhabitants from the main current of university life, but does very effectively lay the foundations of a professional self-consciousness, the value of which it is difficult to overestimate. There are those who tend to criticize some of the more vociferous manifestations of this self-consciousness, but one glance at this audience will make obvious how impeccable a respectability overtakes its exponents in later life. It is then clearly to the University in the main that we should turn if we wish to evaluate the factors that make or mar the quality of the profession, and from a multitude of possibilities I select three only which I believe to be all-important. Firstly, the quality of those who enter the medical school; secondly, the quality and scope of the education

which is provided for them in it; thirdly, the quality of the post-graduate facilities available in the University and elsewhere. A survey of these three points will, I think, put us in possession of the main features of our problem.

First, then, as regards our raw material, and the first question that arises is to what extent there is a wastage of quality at the pre-university stage. No definite answer can be given. It is a fact that in Victoria a smaller percentage of children from State schools reach the University than in any other State, and that there is probably room for a more generous provision of scholarships at the high school stage. But I believe myself that the wastage is not very serious and that the main cause of such wastage as there is, is not so much economic as due to an imperfect appreciation on the part of many parents that the age of fourteen is not divinely appointed as that at which a child must begin to earn money. Today a large proportion of students come from homes whose incomes are at the lower levels, and to talk of the University as a playground of the rich is a travesty of the facts. I think and hope that the Commonwealth subsidy scheme has not only come to stay, but that it will be extended in some form or other to cover a range of medium incomes which it does not touch at present. It has brought to the University very many highly desirable students and there is, as far as I know, no evidence whatever to show that they are not in every way equal to former vintages. Some wastage there still is, I have no doubt, and it is difficult to see how it can be altogether avoided, short of measures of compulsion to which I trust we shall never come, but I do not believe that the number of mute, inglorious Newtons scattered about the countryside is sufficient to cause us any very serious disquiet.

There has been a great deal of animated discussion over the last few years on the thorny subject of the quota system and the methods of selection which it has brought in its train. There are three main schools of thought in the matter. One holds that all selection save by a matriculation examination—preferably at low standard—is unjust even in wartime. The answer here is of course that, though there may be arguments about numbers and methods, the policy that necessitated selection was, quite rightly, laid down by the Government of the country as a war measure and that what is to happen afterwards depends on factors which at present it is difficult to evaluate. The second school believes in selection, but would like to implement it by totally inadmissible criteria—such as the possession of an impeccably Aryan ancestry or the ability to claim lineal descent from Æsculapius. The third also believes in the principle of selection, but finds it impossible to decide between the relative merits of the various methods of achieving it and to compound the correct prescription from the witches' brew of examination, interview, ordeal by psychologist, headmaster's certificate and intelligence test. I do not propose to argue the point with them. They are fond of referring to the practice of some distinguished American schools. There is one vital difference between America and ourselves. We have a very limited number of medical schools of approximately the same standard. They have a very large number of schools of very varying standard. Selection with them does not involve rejection. There is always another school round the corner. Selection with us does. A rejected candidate to all intents and purposes cannot go elsewhere to fulfil his ambition. There are, in my view, two justifications only for a continuance of selection after the war. It may be necessary because the University cannot provide adequate training for the numbers offering. It may be necessary because the numbers offering are such as to exceed seriously the absorptive capacity of the profession. As regards the first, we do not intend to run any risk whatever of diluting the quality of our product by insensate overcrowding. As regards the second, prophecy is of course

difficult and dangerous at a time when ambitious and controversial projects are being freely canvassed. But the plain fact is that, although at the moment there is a desperate shortage of medical personnel in civil life, the prospective peace-time shortage is not serious and will be well cared for by a very small increase in the number of graduates annually produced in Australia. Neither the University nor the Government can afford to ignore this position. The University has no desire to promote the over-population of any profession and the Government would be very short-sighted to subsidize the rehabilitation of excessive numbers into a walk of life that is unlikely to provide them with a reasonable career. It may be, of course, that there will not be an overwhelming rush of those who are ready to face a long and arduous course at the end of the war. But the possibility cannot be neglected and must be remembered in conjunction with the fact that there is no profession in which a high incidence of inadequate employment would be more socially dangerous than the medical, except perhaps that of the lawyer. We have so far in this country—and it is one of the advantages of the comparative restriction of the number and the role of our universities—escaped the ravages of graduate unemployment. I trust we shall continue to do so.

But if selection is to continue, how shall we set about it? Let us be sensible. Any set of schemes, based on lines not entirely fantastic, will, if set to select one hundred people out of any larger number, select, say, eighty of them in common. It is over the last 20%—it may even be as low as 15%—that all the tumult and the shouting arises. It is in fact not the best or the moderate who create the difficulties, but the marginal cases. It is arguable that we take altogether too much trouble about our margins and that anybody who cared to undertake the task of correlating the amount of time, temper and tribulation expended by the University over the business of selecting the last places in a quota with the percentage of total failures on the part of those so selected, could have no doubt whatever on the subject. But our pursuit of quality must count all trouble well spent, though equally ready to pursue any reasonable means of reducing it that may be devised. And the only reasonable means of reducing it is to leave a 20% absolute discretion to the University. If government control of quotas is to continue, that is the only sound method. If it is not to continue, the University will presumably regain its total discretion. It would use it by selecting, say, 80% on the direct results of the matriculation examination and by subjecting such of the remainder as were formally qualified to an interview and such supplementary tests as might be considered necessary, invoking the help of the department of psychology which will shortly be in existence. It would not, in the absence of a definitely criminal record, be swayed to any extent in its decisions by nebulous evidence of character. Is it fair to suggest that at the age of seventeen no further development is possible and that an unsatisfactory school record is to bar all chance of an improvement in the different atmosphere of the University? No one knows better than I that we shall never be able to satisfy everybody. I base my hopes and my belief that substantial justice would be done upon both the quite extraordinary goodwill, perseverance and conscientiousness that have been exhibited by the University staff in their dealings with a most harassing problem and upon the increasing refinement of psychological techniques which, if suitably admixed with common sense, will be of the greatest help to us.

One last word on this before I pass on. Quality is a conception to which it is difficult to apply any system of weights and measures. A purely mechanical attempt to capture it is doomed to partial failure, but this, under the quota system of the war years, is what we have been compelled to make. And the reason for it is one that strikes very deep into the foundation of our

national future and can be summed up in the one word "distrust". The universities were not trusted to use their own discretion in the matter of selection. It was assumed that they would be incapable of running the business in an objective and dispassionate manner. I do not complain that the universities have been especially penalized. This virus of distrust is infecting the whole of our community life. Those who make decisions are assumed to be incompetent or unworthy, and it is becoming almost virtuous to make every effort to circumvent them. "The price of liberty" we all know "is eternal vigilance". Liberty is a commodity in short supply these days and in the black market the price we pay is changing. Our vigilance is not against the enemies of liberty: it is against each other, and it marches in a twilight of suspicion lest the other fellow, no matter what his deserts, gets away with something that we have not got. This heartfelt jeremiad may seem a far cry from the selection of the 167th place in the medical quota, but it has real relevance to my subject. Quality can never flourish in a jungle of distrust.

The quality of any course of study depends only partially upon its technical content. The quality of those who teach it is, of course, all-important; that of the equipment provided and the environment in which it is conducted each play an influential part in the total result. I shall not embarrass our teachers by a recital of their merits. That these are various and distinguished you know at least as well as I do. That they have defects—and I do not doubt that they have—you frequently explain to me with an emphasis which is not, I think, always justified by the facts. But for myself I regard the future of our school as one of the brightest promise, and I could not and would not say that unless I had great confidence in the calibre of our staff. We have been and are very fortunate in the unsparing—and ill-remunerated—devotion of those outside practitioners to whom the clinical schools owe so much, and it would be ungracious on my part to miss this opportunity of expressing our deep gratitude to them. Some day we shall unearth that fabulous benefactor who will provide endowments for the chairs of medicine and surgery which have eluded us for so long. But, pending that happy and necessary event, let us never forget the very real advantages we derive from our close contacts with men eminent in the daily practice of their profession who are prepared to sacrifice so much of their time and energy for the welfare of coming generations. As regards our equipment and environment, I need say little. No professor would be so short-sighted as to lead the Vice-Chancellor to suppose that his department was anything but a gaping void of urgent and expensive needs, and I have been unable to discern the slightest trace of myopia in any of the senior members of our pre-clinical departments. That there are serious needs in some quarters, I know well: they will be gradually satisfied in course of time. But in general our equipment is adequate for what we have done and are doing. But do not accuse us of undue complacency. We are producing efficient practitioners. We are using the resources which we possess to fair advantage. But they compare very unfavourably with the resources of first-rate schools overseas. A medical school in a university should be able to do more than we are doing. It should provide its graduates with better general foundations than we can at present compass, and it should make far greater contributions to the welfare of the community at large through its schools of research than it is at present in our power to furnish. I proceed to some considerations of these points.

I could not, of course, even if I would, speak in any detail about the content of the course itself. There are two matters only to which I make brief reference. The first is that I cannot bring myself to believe that the time spent on German in it is anything but a sheer waste of the most precious

of all commodities. The most ardent exponent of the theory that language is the only doorway to culture could hardly maintain that "German A" unlocks it to any appreciable extent, and the handful of students to whom the knowledge will be of any practical use could well be left to acquire it for themselves at their own convenience. My other point has often been made before. In his clinical years a medical student tends inevitably under present circumstances to drift out of touch with the University and its staff. But he is still a student and should have opportunities for consultation and guidance which it is difficult for a hospital to provide. There should be a full-time sub-dean of the faculty charged with the duty of keeping in touch with the clinical years and I hope that, when the manpower position eases, it will be possible to provide such an officer. Throughout the University the tendency, accentuated by the needs of returning servicemen, is to organize guidance and tutorial services for students on a scale never attempted before, and I regard it as a thoroughly desirable development.

The fact that I have refrained out of deference to the nature of my audience from detailed comment upon the actual content of our medical course—which I must assume to be the product of the combined wisdom of the faculty—does not, however, imply that I am satisfied with it in certain of its wider aspects. I am not. Considered from the point of view which I have outlined, it does not and it cannot do real justice to the full potentialities of those who undertake it. The aspirant for a medical degree is faced with a long, arduous and all-absorbing curriculum which consists entirely of technical subjects. The prerequisites for that curriculum stretch their tentacles back into the final—and developmentally crucial—years of school life. At a time when more fortunate students are able occasionally to stand off and have a look at things in general, the medico, coming to the University at the age of seventeen, plunges deeper than ever plummet sounded into a sea of professional subjects from which he reemerges at the end of his course to undertake the practice of a profession which will give him little leisure and heavy responsibilities. Is it any wonder that critics are fond of referring to the University as "nothing but a technical school"?

Now the University is of course a technical school and there is nothing to be ashamed of in admitting it. But, despite all its present imperfections, it is more than that. Many of its teachers do influence the outlook of those who pass through their hands in innumerable ways outside the mere text of their teaching and do do their utmost to counteract that narrowness of view which the lack of time and opportunity to widen it imposes on so many. But they are fighting a rearguard action without much ammunition. It is idle to blink the fact that the clash between liberal and specialist education has been won by the latter and that the result is in harmony with the higher stage of social differentiation towards which we are heading. "Gentleman", in short, has been beaten by "'Pothecary, Tinker, Tailor" and all the rest of them, and his chance of making any kind of a comeback is made no easier by the fact that his nominal allies—those who still try to represent the arts—are in many cases every bit as specialized as the scientists whom they criticize so acidly. They too have tended to build themselves into watertight compartments with no windows and it does not look as if the cultural education which must both balance and underpin vocational training—for that in fact is the object of our search—can easily be derived from the present organization of our universities. Yet from the community point of view it is, I am sure, a wicked waste of quality that those with the intellectual capacity to reach a university should be permitted to leave it with little or no understanding or experience of the cultural process as a whole. To acquiesce in a position the logical outcome of which is that all virtue should be concentrated in the

particular whilst the general is left to the untender mercies of the chance comer, is to invite complete disaster in tomorrow's world.

We must endeavour to be practical about the problem. When I first became impressed with its importance, my attention was directed to the immense development of liberal arts curricula and so-called liberal arts colleges in the United States of America—institutions, some independent, some attached to existing universities, offering courses of from two to four years designed to provide a general foundation of the widest kind for the vocational courses which would follow them and for which they were prerequisites. I came to the conclusion that something of the same kind was necessary here and suggested that a two years' post-leaving course of study to consist of at least 60% of general subjects of a non-specialist character with little or no formal examination attached to them should be the goal at which we should aim, and that this course, which should be a prerequisite to entry to a professional course, could serve a useful purpose, not only for those who purposed for themselves a career in a profession, but also for a much larger number of embryo citizens who could profit by more higher education than was normally available to them at present. I still think that in the main I am right. But there are many difficulties in the way both of detail and principle. Our American friends tackled the problem in the years after the last war with all that fierce energy and enthusiasm, that splendid disregard of financial handicaps and that extraordinary mixture of first and third rate which characterize their educational endeavours. The country is full of graduates who have been subjected to a training in the liberal arts and have undergone so-called orientation courses. But it is my impression from many conversations that a satisfactory orientation has not on the whole been the result of them, that they cover too wide a field with a "bits and pieces" technique, and that they do not make adequate provision for that intellectual discipline which is the root of real education. I do not say that a satisfactory course cannot be devised: I only say that I have not yet seen one and that I am beginning to doubt whether any kind of synthesis of the cultural process that is suitable for the needs of immature minds can be provided through the medium of formal courses of instruction. As far as this country is concerned, difficulties arise at once. Where should such a course be given? If at the schools—which would probably be the practical solution—is there any real likelihood of the early provision of staff and equipment upon the necessarily very considerable scale? If at the University, the same limitation applies with the added fact that we are already within sight of the end of any possible expansion on our present site. If at specially designed institutions—for example, residential colleges in the country which would be an admirable development—where is the Crœsus with the necessary vision? A liberal education on this scale presupposes a liberal purse and education will have to fight hard over the next few years in a fiercely competitive arena if it is to retain what it has at present. There is, moreover, one other overriding consideration which is too often neglected by our educational theorists—the time factor. It is a curious thing that in both Great Britain and the United States of America average people are prepared to acquiesce in a postponement for their children of the money-earning age in the interests of education very much more readily than they are here. Too many Australians have an idea that it is somehow *infra dig* to spend more time in the business of qualifying for the economic arena than is minimally necessary—and that is one of the highest hurdles that our reformers have to surmount. It is a psychological more than an economic obstacle which would not be completely overcome by the provision of scholarship or subsidy facilities on a more generous scale than at present. And there is a further difficulty—an internal

one. If extra time became available, every specialist in sight would be after it in full cry. It would be useless to tell them that students cannot learn everything, that something must be left to their own initiative and enthusiasm, that in these days of abstracts and reference books and easily available knowledge of all kinds the fact that the content of their subjects is increasing does not necessarily involve that the length of their course should do likewise. The faculty of science is at present considering an increase of its courses by one year. It may be hoped that this will not involve a corresponding increase in their technical content.

Are we then just to go on talking and waiting while the specialists dig themselves in? By no means. The root of the matter lies and must continue to lie in the schools. Comparisons with American and British practice are apt to forget the fact that in the former country much of the liberal arts course is taken at a standard and at a stage that we should relegate to the secondary school and that in the latter the average age of entry to a university is at least a year later than it is here. Some of our schools—the better ones—recognize clearly the dimensions of the problem and are doing what they can to tackle it. Others—the majority—do nothing and blame the University for making progress impossible by the rigorous prescription of its prerequisites for matriculation. The University is not and cannot be entirely innocent in the matter unless it is prepared to reduce the standards of its first year courses to an entirely elementary level—which it is not. No reform will please everybody, and I should be the last to hold that further changes will not take place. But the fact is that under the present matriculation system which was inaugurated last year, the good schools can do much more than in the past towards giving their senior pupils some foundational equipment which will incite them to take advantage of such opportunities as the University does offer them—and they are very real—outside the high walls of their specialist courses. As long as examinations exist, the bad schools will continue to cram relentlessly for them and criticize the University for the crimes they commit themselves. I have no prescription for their malady which I should care to mention in these august surroundings. Some day it may be possible to raise the minimum age of entry to the University to eighteen and insist on a post-matriculation year to be spent at school in general study, or perhaps in the outside world in contact with real life. But that time is not yet. For the moment what more can the University do in the face of all the varied difficulties which I have outlined? I do not, as I have indicated, believe that, under present circumstances at any rate, the provision of cultural courses will get us anywhere. But I should like to see within the University a far greater number of lectures or lecture courses on general subjects and subjects bordering on two or more specialist fields, open to the voluntary attendance of any student. Every department could and, I am sure, would make some contribution to this—though I know well how great are the existing burdens—and the possibilities will be widened when certain of the proposed new chairs come into existence—psychology, Oriental and Semitic studies, and fine arts. It is essential too that our new library be built at the earliest possible moment. There is no temptation whatever to read in the present building unless compelled, and until we can provide attractive opportunities for extra-curricular work it is difficult to expect many converts. Whether it is in fact possible to lighten existing courses I do not dare to speculate beyond again expressing a hope that German may follow the Latin prerequisite in the medical course and not be replaced by anything. And I wonder sometimes when I am all alone and there is no chance of any specialist reading my thoughts, whether it might not be possible to slough off some portions of the later years into courses of post-

graduate study—to be given either by the University or by such a body as the College of Surgeons—which brings me conveniently to the last of my three original points.

Those who survive to the bitter end the rigours of the medical school emerge from it through the gateways of graduation and registration to take their place as full members of the profession. In due course their respective tastes and talents lead them to careers as general practitioners, specialists in the Collins Street area, government servants of divers kinds, or teachers and researchers. There is room in the profession for a very wide variety of character and ability—a fact which makes it all the more important not to restrict unduly criteria of selection. The student when he leaves the University has, it may be hoped, in addition to the elements of a professional self-consciousness, a conviction that his technical knowledge and general intellectual equipment are far from complete, that he has much to learn in the school of experience, and that the quality of his career will depend to a very considerable extent upon his ability to keep pace with the advances of his subject in a wide variety of fields. But, alas! the cares of this world—under present circumstances I will not complete the quotation by adding "and the deceitfulness of riches"—too often overwhelm his good resolutions and he drops each year a little further out of touch with the latest developments. This is a problem which concerns all of us who are interested in the quality of the profession. The University in whose laboratories some of these developments may from time to time take place, cannot and should not wash its hands of its graduates' interests—the more so as I believe we are on the verge of a real renaissance of research in most university departments and not least in the medical school. Now research these days is a word that is a cloak for much that it should not hide. If a broadcasting organization employs a totally untrained girl to ascertain from the inhabitants of a particular street how many of them were rash enough to listen to a children's session on last Thursday week, that is research. A very high percentage of the young people of school age who consult me about their futures wish in a vague sort of way to do research, inspired thereto, I suspect, in too many cases by the comic strip professors whose adventures we all follow so breathlessly in the daily Press. Others talk of research when they really mean opportunities of keeping their reading up to date. Others—I am of course referring to no living person or university—will tell you in a nostalgic and ineffective way of the research they could do if it were not for the pressures of other duties. It is a pity that a noble name for one of the noblest of human activities should come to base uses. The fact surely is that there are few people who are qualified to direct or undertake real research, that those that there are are assets of priceless value to the community, and that when a man has the flame burning in him he will not allow anything in the way of trivial interests to prevent him from keeping it bright, whatever the obstacles that circumstance may put in his way. It is because we are lucky enough to have some men—and young men—of this calibre that I say we are on the verge of a renaissance. These are the men we must support by every means in our power, by seeing to it that they are relieved to the utmost extent possible of administrative and undue teaching burdens, and that a Melbourne chair does give opportunities to its holder of making his name as a researcher—which, I am all too conscious, is not as much as it should be the case at present. I have great hopes that increased funds for research will shortly be available from various sources, both public and private, but that is a consideration, important indeed, but secondary to the men and the provision of the necessary opportunities for them. Now the University has of course no monopoly of research. It is its business not only to foster its own schools but to cooperate in every

way with others, to do all that is possible to avoid undue dissipation and duplication of effort and to act as a general fertilizer of research activities throughout the community. As regards the first, I look forward to various developments. I am confident that in our various departments there will emerge after the war, if the finance is made available, post-graduate schools of high calibre which will attract first-class men to stay with us and in Australia. I need not emphasize the supreme importance of this point. We must be able to send our graduates abroad in increasing numbers. But we must also be able to attract them to return to us and we must inevitably be at a disadvantage here until there are, not here and there in individual universities, but in all universities, adequately financed and equipped schools of research which will cooperate in major fields and become so essential a factor in the community that their reputation will persuade not only our own graduates to return to them, but workers from other countries to visit them as well. I know that as time goes on our liaison with the Walter and Eliza Hall Institute will bring us very great advantages, and I hope that the pattern evolved there—that of a university research department within the Institute under a director who becomes a research professor of the University—may be extended in other directions. I believe too that there is an important place in the University for the flourishing of small groups of workers, financed and directed by outside agencies, but giving to and receiving from the University the benefits of contact and cooperation, such as the Council for Scientific and Industrial Research groups that have worked here during the war and the units which we have housed from the Army and the Air Force. There is a bright future along all these lines. But we cannot be and must not try to be responsible for too much. It is often forgotten to how great an extent our universities in Australia are maids of all work. In both Great Britain and the United States of America there is a variety of institutions and some degree of differentiation of function. In Australia there is one institution in each State and there is a constant danger that such an institution will be compelled by pressures difficult to resist to overstrain its resources with resulting damage to the whole fabric. We must work to counteract this danger at each end of the scale by invoking all the help we can get from outside bodies. With the lower end I need not here concern myself, save to emphasize the dangers of any undue widening of the scope of university recognition. The upper end, however, is most relevant to the point at issue. I have said that the University arrogates to itself no monopoly of research. But we believe that our medical school will be incomplete, that it cannot do what it ought to be doing until we can establish clinical schools of training and research of our own and we have definite ambitions in that direction. Their establishment would of course arouse many problems with which I cannot deal now, beyond saying that the debt of gratitude we owe to the existing hospital schools is so great that we could never envisage any scheme that did not involve the closest cooperation with them. Very large sums of money would be involved which are not at present in sight. But some day we shall reach the rainbow's end, and when we do we shall grasp the pot of gold with both hands. For the moment, however, we must concern ourselves with the near future. We are faced with the problem of returning graduates who must be given refresher courses of study essential to them for their own benefit and for that of the community. We are faced at the same time with the problem of dealing with reconstruction trainees in all schools—and that alone will more than occupy our energies. Our staff of course will inevitably be concerned with both problems, but I welcome most cordially the fact that the Committee of Post-Graduate Studies is undertaking the general responsibility of organizing the necessary activities for graduates. That does not mean, of

course, that the University can divest itself of responsibility in the matter. But I am not concerned here with any attempt to work out the details of the relationship. What I wish to emphasize is that it is by means of increased cooperation with outside bodies that the University can best and most fruitfully hope to develop an expansionist policy in the near future—particularly in its more technical schools. I have already referred to one example of this in the shape of our recent agreement with the Walter and Eliza Hall Institute. The Committee of Post-Graduate Studies will assist in tiding over the difficult post-war period, and I believe that this connexion should grow, as the temporary pressures relax, into a permanent arrangement whereby opportunities for retaining a reasonably close touch with current developments of a general character should from time to time be afforded to our graduates. In addition to this there is the question of what may be termed the higher technical education of practitioners—education of a kind which is and which should continue to be outside the scope of their university medical course. That course cannot contain everything, and it is most fitting that there should be some division of responsibility between the University and other bodies whose basic objectives are to further the quality and welfare of the profession. The Royal Australasian Colleges of Surgeons and Physicians are such bodies, and it is to them that we must look for the provision of this higher technical study for those of our graduates whose quality is sufficient for aspiration to their membership. Here too of course the cooperation of the University must be and will be available at all times—cooperation that will be fuller and more fruitful than it can be at present when our full-time chairs of medicine and surgery come into being and the day to day burdens of the senior staff can be lessened. When that happens it will be possible to envisage a joint attack upon problems of research in surgery and medicine in which university, colleges, hospitals and institutes can play their parts with the minimum of duplication and waste of effort. I look forward, Mr. President, with you to a progressive increase in the scale of our operations—I speak, of course, figuratively as far as I am concerned—and I assure you of the desire of the University to do all in its power to help in forwarding the essential objectives of your College.

I have come to the end of my task. I am, as you will realize, no revolutionary. The quality of the medical profession depends in a very essential way upon the University. The University, when it contemplates the profession as a whole, finds reason for pride in what has been achieved and sees no reason to believe that any violent change in its own pattern is necessary. In days such as these, when values are shifting and standards are everywhere in danger, any association of persons that puts the pursuit of quality above other considerations, that holds up to its members the necessity—a necessity which they willingly accept—of spending much of their time in altruistic work without thought of personal advantage, that stands firmly based upon rigid rules of ethical behaviour—such a body has today double its ordinary social value. Do not believe those who tell you that the golden age of the learned professions is past. There is a future before us, hard maybe, perplexing and laborious, but fuller of infinitely worthwhile tasks than any future has ever been. Let us face it in good heart, believing with that learned doctor Sir Thomas Browne that "marshalling all the horrors and contemplating the extremities thereof, I find not anything therein able to daunt the courage of a man".

CARCINOMA OF THE RECTUM, WITH SPECIAL REFERENCE TO SPHINCTERIC CONTROL.[1]

By J. A. JENKINS,
Dunedin.

RADICAL OPERATION for carcinoma of the rectum must necessarily continue to be the method of choice in the majority of cases for which surgery is employed.

While a brief description is given here of the procedure adopted in cases in which the sphincteric mechanism cannot be saved, the exceptional case in which conservative surgery is possible is dealt with in greater detail.

A TWO-STAGE OPERATION.

The routine I have followed involves a two-stage operation. The advantages of this procedure are several and considerably outweigh the disadvantages which lie in the risks and the discomfort of two operations. The dangers of sepsis, for example, are greatly lessened by the exclusion of bowel contents, by the practicability of cleansing the rectum and colon by irrigation and antiseptics, by the peritoneal reaction to the first stage which renders infection less likely at the second, and by the fact that when division of the colon is finally effected the field exposed to sepsis is considerably reduced. Bowel function furthermore is satisfactorily established before the second stage is undertaken. The time involved in the second stage is less than in a one-stage operation and is less trying on the patient.

The contraindications to the two-stage procedure are: (*a*) the presence of any degree of obstruction and (*b*) the danger of a closed loop, which may result from stenosis of the lumen before the second stage is carried out. The procedure, furthermore, should not be undertaken unless it is certain that the second stage will eventuate.

The First Stage.

The first stage involves an exploration of the abdomen through a left oblique abdominal incision. The liver, pelvic mesocolon, aortic region and pelvis are explored, and the tumour is palpated to determine the extent of the growth and its fixity. The degree of mobility and length of the pelvic colon are also ascertained. If conservative operation with preservation of the sphincters is decided upon, a transverse defunctioning colostomy is carried out. If a radical perineo-abdominal excision of the rectum is not contra-indicated, a terminal colostomy is performed as follows.

The pelvic colon is exteriorized and the level at which section is to take place is selected. The peritoneum is split on each side of the mesentery from this level down to the inferior mesenteric artery. In cases in which there is little or no mesentery the descending colon must be freely mobilized. The left ureter is always in danger. Heavy artery forceps or small Peyr's clamps are placed across the colon, which is then divided by a cutting endotherm current, the raw surface is coagulated and the distal part of the colon is closed. Vessels in the mesocolon are divided and ligated and the section is extended down as far as the inferior mesenteric artery. The peritoneal edges on each aspect of the mesentery are sutured together. If this is not

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carefully carried out, adhesions will render the second stage more difficult. The closed distal stump of the colon is intussuscepted into itself as far as possible and placed in the pelvis.

The proximal stump held by forceps is retained in the upper angle of the wound, the lateral peritoneal passage is closed by suture, and the abdominal wall is closed. "Vaseline" gauze is placed around the protruding stump and is covered by a sheet of green protective tissue, through which the stump protrudes. No stitches pass into the bowel wall.

On the day following operation the forceps are replaced by large safety pins that transfix the stump of colon and prevent its recession into the abdomen. A catheter is passed into the bowel lumen and olive oil is injected. The "Vaseline" dressing is not interfered with until the sutures are removed.

The Second Stage.

The second stage is carried out about three weeks after the first stage. With the patient in the exaggerated lithotomy position the perineal part of the operation is done first. The dissection is carried so far that little is left to be completed in the abdominal stage. After removal of the pelvic colon and rectum and closure of the pelvic diaphragm, sulphanilamide powder is applied to the pelvic floor. The abdomen is thereupon closed. The method of treatment of the large pelvic cavity is extremely important as severe septic absorption may occur from this wide area. The patient is held in the lithotomy position for a few minutes while sulphanilamide powder is applied to the pelvic cavity and a "Vaseline" gauze pack (three-inch ribbon-edge gauze) is introduced. The perineal wound is then closed except where the pack emerges. Subsequently this dressing is gradually removed, commencing about the tenth day. A catheter and tidal drainage prevent the threatening bladder infection. I have found that the pack has marked advantages compared with other methods. Prior to the advent of sulphanilamide I used tannic acid to paint the wall of the cavity and packed with "Vaseline" and cod liver oil dressing.

CONSERVATIVE SURGERY OF THE RECTUM.

Conservative procedures in which the sphincter mechanism is retained are numerous and fairly extensively reported in the literature. I can only briefly review the various procedures here.

Aldrich Blake,[1] in a one-stage abdominal and perineal approach, effected suture of the pelvic colon to the anal stump after splitting the anal musculature posteriorly as far backwards as the coccyx. No effective repair of the sphincter was made. She also mentions the principle of the pull-through method now associated with the name of Hochenegg.

Babcock[2] describes two methods in an abdominal and perineal approach, one based on the Hochenegg principle and the other a two-stage procedure in which a perineal anus is converted into an opening at the normal orifice.

Grey Turner[3] describes a cuff resection of the rectum from a mid-line post-anal approach in which an end-to-end anastomosis is done.

Rayner[3] in the same discussion stresses the importance of preliminary transverse colostomy and describes a telescoping operation.

Pannett[4] describes an end-to-end anastomosis of the pelvic colon to the rectal stump. An abdominal stage in which satisfactory vascular supply is ensured, is first done and the anastomosis is carried out from a sacral approach.

Devine[5][15] stresses importance of a defunctioning transverse colostomy and describes a modified pull-through operation in which the mucosa of the upper part of the anal canal is removed.

Gehrels[6] describes two methods, both done through a wide sacral and perineal approach. (i) Where only a short stump of rectum remains above the anal sphincters, he carries out the Hochenegg procedure. He claims that two-thirds of his patients achieved full control by this method. (ii) Where a long stump of rectum remains, a two-stage procedure is carried out and a perineal fistula is later converted into an opening at the normal passage. He also quotes Hochenegg, of Vienna, as having obtained sphincteric control in 250 cases with 33% of five-year cures, and Kuettner with a comparable number and with 40% of five-year cures. The sphincter is conserved in 25% of the cases of radical operation for cancer of the rectum performed by Hochenegg and in 40% of those performed by Kuettner.

Gordon-Watson,[7] in an extensive review, accepts the soundness of conservative surgery in selected cases.

D. Robb[9] reports a small series, but gives no details of technique.

The soundness of the conservative procedure and the indications for its adoption in selected cases are fully substantiated and discussed by the above authors. Furthermore, in addition, the pathological work of Gabriel, Dukes and Bussey,[9] and Dukes and Lloyd Davies quoted by Gordon-Watson,[7] W. Quarry Wood and D. P. D. Wilkie,[10] and Westhues quoted by Pannett,[4] does not contradict the view. Briefly, the conception of the earlier hypothesis of the manner of spread, which was based on the work of Miles,[17] has now been greatly modified in the direction of the safety of incision of the rectum close to the tumour. For example, Pannett[4] states that it can be safely incised 1·5 centimetres below the tumour and 2·5 centimetres above.

Functional results are mentioned by most writers and all appear to be reasonably satisfied with the control achieved, although the patient's viewpoint on this important matter is not discussed. Kirschner,[18] however, does state that: "It is only to be regretted that even after perfect healing complete continence is rarely achieved, due to unavoidable damage to the sphincter and to the nerves of the sacral plexus supplying it."

Personal Observations.

I have attempted various conservative surgical procedures, brief case histories and comments on which are given below.

CASE I.—A woman, aged thirty-eight years, was operated on in October, 1927. She had a fungating carcinoma involving one-third of the circumference of the rectum four inches from the anus. In the perineal stage of the operation the anal mucosa was dissected up and ligatured and the sphincters were split back to the sacrum. The rectum was separated from the anal canal and freed. In the abdominal stage the inferior mesenteric artery was ligated and divided above the last sigmoid artery. The colon was brought through the sphincters and the sphincteric ring was reconstituted. Convalescence and healing were satisfactory.

In December, 1929, two years after operation, the patient stated that unless she took a laxative she was continent, but that the bowel did not feel normal. The tone of the external sphincter was satisfactory.

One year later there was some narrowing of the anus with tendency of mucosa of colon to prolapse.

In June, 1944, seventeen years after operation, she reports by letter: "My general health is fairly good. The bowels have not functioned normally since the operation. I always have to take a laxative. The control of the back passage is not normal. I can tell beforehand if the bowel is going to act; sometimes I get a normal sensation and sometimes a severe pain in the abdomen, but only for a second or two. The bowel does not leak without my knowing it, but it will if I cannot get to the lavatory quick enough. I much prefer my present condition to a colostomy."

Without a preliminary defunctioning colostomy this procedure is too hazardous. Splitting the anal sphincter and ano-coccygeal raphe posteriorly in the mid-line permits of fairly satisfactory immediate repair. Slight sepsis, scarring and surgical damage to the sphincter mechanism, however, yield a

badly damaged structure. Complete division of the ano-rectal ring always means marked loss of function.

This procedure was also carried out in two other cases, but in neither did perfect control result. Nevertheless, all three patients were happier with an imperfect anus than they would have been with a colostomy.

CASE IV.—In one case a Hartman operation was done following a defunctioning transverse colostomy. The mass was due to diverticulitis, but I report it here because it throws light on the innervation and function of the lower part of the rectum and of the anal sphincters. Some three inches of rectum remained. The anal sphincter in this case is normal. The internal sphincter can be palpated and does not differ from the normal. There is no functional disturbance of defæcation or control.

It will be obvious that in a Hartman operation the lumbar colonic nerve is divided, the intrinsic nerve plexus of the rectum is partly removed and the hypogastric nerves may or may not be divided. The lower stump of rectum and the internal sphincter retain their supply from the *nervi erigentes*. The result in this case would suggest that the longer the stump of rectum left, the closer defæcation and sphincter control approach to the normal.

The ano-rectal ring was retained intact in the following two cases, in each of which a preliminary defunctioning colostomy in transverse colon was done.

CASE V.—A female patient, married, aged fifty-eight years, was operated on. During the perineal stage an exaggerated lithotomy position was adopted; the coccyx was not removed. The ano-coccygeal raphe and the posterior vaginal wall were split. The sphincters remained intact. The rectum was freed and divided between clamps at its junction with the anal canal.

In the abdominal stage the rectum and pelvic colon were removed and the stump of the colon was brought down to the anal canal and these were sutured end to end. Healing was unsatisfactory and there was some separation at the line of suture, with a fistula into the vagina. A fistula one-third of an inch in diameter still remains to be closed between the vagina and the new "rectum".[1]

The present condition, eighteen months after operation, shows good voluntary control of the sphincters and normal sensation. The groove between the subcutaneous external sphincter and the internal sphincter cannot be palpated. There is evident lack of tone of the internal sphincter, but if this were not specially investigated the anal canal could pass for normal.

The technical difficulty of this operation is considerable. Splitting the posterior vaginal wall greatly aids exposure, but the complication of fistula makes the price rather high. End-to-end suture is too hazardous. Extended sacral exposure and delayed anastomosis, as suggested by Gehrels[(8)] (Goetze operation), would seem to be the operation of choice if this principle is to be followed.

CASE VI.—A female patient, married, aged seventy-one years, was of the senile type and in poor general condition. She had an early growth low in the rectum, possibly too low for safety.

At operation an exaggerated lithotomy position was adopted and the coccyx was removed. The ano-coccygeal raphe was split. The sphincteric mechanism was left intact. The post-vaginal wall was split. The rectum was freed. The recto-uterine pouch was opened and the pelvic loop was mobilized as far as possible. The rectum was divided between clamps at the ano-rectal junction. The rectum was removed and the pelvic colon was drawn down through the anal sphincters (Hochenegg principle). The peritoneum was closed round the colon. The stump of the colon was held down by transfixing safety pins outside the anus, with a "Vaseline" gauze pack to protect the skin from pressure.

Three weeks later the stump of the colon was firmly fixed and the skirt of redundant tissue was removed.

The post-operative condition of the anal canal showed normal sensation. The whole anal canal was rather lax. Voluntary contraction of the external sphincter was possible, and a powerful response was caused by faradic stimulation of the pudendal nerve. Straining or coughing caused immediate contraction of the voluntary sphincter. The lower end of the internal sphincter was not evident as a definite structure. Apparently all the voluntary striped muscle was functioning normally and the

[1] Since this paper was submitted for publication satisfactory closure has been carried out.

non-striped muscle of the internal sphincter had lost tone. The patient can tell when the "rectum" is full and can control the bowel by the voluntary sphincter for sufficiently long to get to the lavatory.

A perineal operation was done in this case, firstly, because the tumour was small and seen in an early stage, and, secondly, the patient's condition made any more extensive procedure dangerous.

The method adopted here in obtaining union between the colon and the anal canal is the most satisfactory in this small series. The ano-rectal sphincteric ring is retained intact as far as musculature is concerned. The undisturbed anal mucosa with a normal tactile sense greatly aids control. Dangers of failure of anastomosis are minimized, a slough being the only likely cause (no other procedure will be any more successful should this occur). The preliminary defunctioning transverse colostomy makes the procedure relatively safe. A wider sacral exposure with consequent avoidance of the vaginal approach will be adopted in future.

Discussion.

The detailed anatomy of the anal sphincters has been the subject of many papers (Milligan and Morgan,[11] Milligan, Morgan, Jones and Officer,[12] Eaton,[13] Paramore[14]) and is not discussed here. The subcutaneous and deep

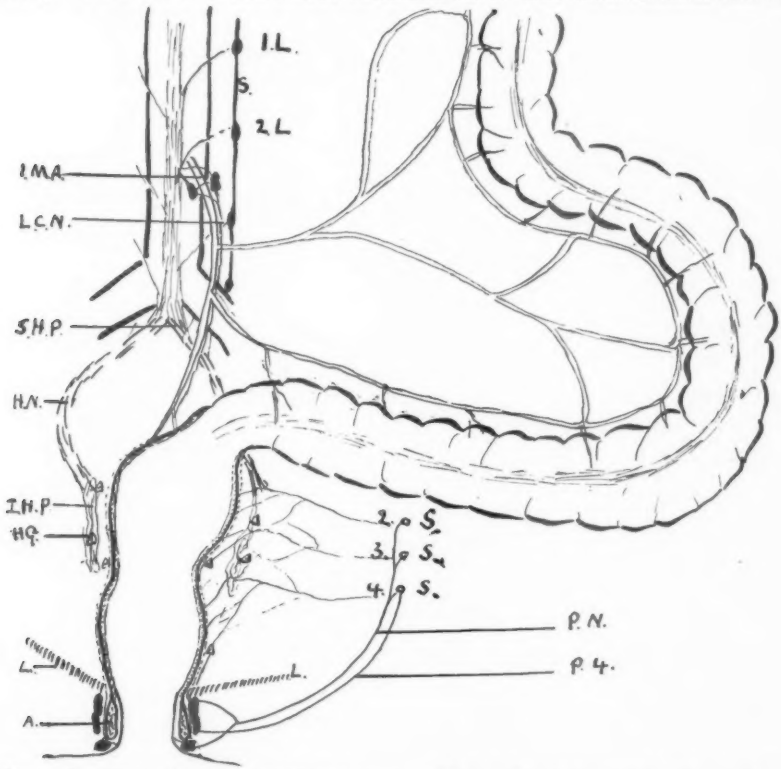

FIGURE I. Illustration of vascular and nerve supply of the distal colon, rectum and anus. S = lumbar sympathetic chain; I.M.A. = inferior mesenteric artery; L.C.N. = lumbar colonic nerve; S.H.P. = super hypogastric plexus; H.N. = hypogastric nerve; I.H.P. = inferior hypogastric plexus; H.G. = hypogastric ganglion; L. = *levator ani*; A. = *sphincter ani internus*; S. = sacral nerve roots; S.2, S.3, S.4 = *nervi erigentes*; P.N. = pudic nerve; P.4 = perineal branch of fourth sacral nerve.

external sphincters derive their nerve supply from the hæmorrhoidal branches of the pudic nerve and the superficial external sphincter from the perineal branch of the fourth sacral nerve. These nerves can be readily saved in any conservative procedure. (See Figure I.)

I can find no reference in the literature to the condition of the involuntary internal sphincter following resection of the rectum or to the part it plays in maintaining continence. There is also an absence of information as to the effect of resection of the rectum on the reflex mechanisms which are so important in normal defæcation. This important functional aspect has not been considered in surgical journals, and anatomical continuity has been regarded as the chief criterion of a satisfactory result.

A patient with an abdominal colostomy will in time acquire habit and knowledge of when the bowel is about to act. It would be interesting to know to what extent this is involved in the operation under discussion.

The innervation of the internal sphincter and its functional relationships have been the source of an enormous literature, all of so conflicting a nature that few statements emerge undisputed.

Garry[19] reviews the controversial and conflicting evidence on innervation and results of nerve section. The effect of interruption of the thoraco-lumbar sympathetic outflow on the anal sphincter is undecided. In this connexion Garry quotes Field and Ungley and Anderson: "Destruction of the lumbo-sacral cord causes dilatation of the anal canal. In the course of time this dilatation becomes less obvious, and, on superficial examination, the anal canal appears to be normally closed. Part of this closure is probably due to the unstriped sphincter, since the inferior mesenteric ganglion exerts a tonic influence on the internal sphincter." Again: "Stimulation of the thoraco-lumbar outflow gives variable results differing in different animals." In regard to parasympathetic innervation he also quotes: "Section of the sacral outflow (*nervi erigentes* or pelvic sympathetics) leads to dilatation of the internal sphincter." And: "Stimulation of the sacral outflow gives variable results in different animals." Furthermore: "In defæcation an effective stimulus to the caudal end of the colon leads to contraction of the colon and to relaxation of the anal sphincter. The afferent pathway from the gut and the efferent pathway to the colon and to the internal anal sphincter are the pelvic nerves."

Starling's "Principles of Human Physiology" [20] states that "the internal sphincter is supplied by the sacral and hypogastric nerves".

According to Rankin and Learmonth,[21] the sympathetic nerve supply to the rectum is from the intermesenteric plexus. In vertebrates the internal sphincter of the anus is innervated through the thoraco-lumbar sympathetic outflow (Gaskill, "The Involuntary Nervous System").

Learmonth and Markowitz[22] found in laboratory animals and in man that the thoraco-lumbar outflow provided the motor supply to the sphincter.

Denny Brown and Robertson[16] carried out an exhaustive clinical research which has a very important bearing on the conservative surgery of the rectum. They have determined that:

(*a*) Voluntary control over defæcation involves only the sphincter ani externus which is not tonic, but contracts reflexly in the course of the flexion reflex, and in synergy with the remainder of the abdominal parietes.

(*b*) If the delivery of fæcal material from the colon is adequate, the mechanism of defæcation depends primarily upon the reaction of the rectum to distension, which results reflexly in a relaxation of the sphincter mechanism.

(*c*) Postural tone of the [internal] sphincter ani internus is dependent upon a local mechanism, probably related to the intramural nervous plexus. It is essentially unaffected by transverse spinal lesions. Change in tonicity of the sphincter reflects only the degree of activity of the rectum and possibly the distal colon.

These authors conclude therefore that:

> The reciprocal relationship which holds between the rectum and anal sphincter is therefore the basis of a mechanism which can secure co-ordinated evacuation. . . . The stimulus for its occurrence is distension of the rectum, and sufficient relaxation of the sphincter to allow some passive evacuation of fluid under its own pressure does not occur unless active reciprocal contraction of the rectum provides the driving force of the reaction.

They go on to point out that, in their experience, "laxity of the anal sphincter appears to be the tonic effect of continued colonic distension of moderate degree. . . . The resistance of the internal sphincter . . . reflects the degree of distension of the lower bowel and rectum", and continue: "There is no evidence that it [the external anal sphincter] is maintained in closure in the intervals between evacuations. Palpation with the finger gives the impression of a constricted rim at the site of the external sphincter only during an effort to hold, or during a flexion or other reflex which closes it." The authors point that, although it contracts in synergy with the abdominal wall, it does not do so during defæcation.

Best and Taylor[20] state that the rectum, like the bladder, is capable of controlling evacuation through its intrinsic nervous mechanism. They point out that "in involvement of the sacral segments of the cord in man there sometimes may be almost perfect automatic control of the rectum and anal sphincters".

White and Smithwick[20] maintain that "after sympathetic denervation of the normal rectum and colon no alteration was visible either in basic tone of the bowel, its peristaltic activity, or its sensory acuity".

Unless the parasympathetic fibres of the sacral outflow (*nervi erigentes*) pass to the internal sphincter with the internal pudic artery, it is difficult to see how this muscle can retain its nerve supply in any removal of the rectum. It is usually assumed, however, that these fibres pass forwards to join the pelvic plexuses. In any resection of the rectum extending from the ano-rectal junction up, the nerve supply to the internal sphincter must necessarily be sacrificed, and this accounts for the loss of tone that is stated always to accompany a division of these nerves. The important reflex mechanism associating the anal canal and the rectum with its afferent and efferent pathways through the *nervi erigentes* must surely be destroyed. The possibility that local nerve plexuses in and about the internal sphincter later maintain some degree of postural tone cannot be ignored.

I have recently examined two patients with division of the *corda equina* and in each instance the internal sphincter had the atonic feel similar to the cases reported herein.

It appears very doubtful whether the thoraco-lumbar outflow plays any part in sphincteric control, and in any case it is completely divided in resection of the rectum, and cannot be expected to function at all after operation. If this is the main nerve supply to the internal sphincter, as maintained by some writers, we might expect very definite clinical findings in those patients who have the thoraco-lumbar sympathetic supply divided for such conditions as dysmenorrhœa, bladder pain *et cetera*.

On general grounds it might be expected that the non-striped internal sphincter would possess continuous postural tone, a tone that varies slowly in response to reflexes from the bowel above. Continence would depend, then, on its unceasing vigilance, a fact of which the patient would be quite unaware.

The external sphincter is composed of striped muscle, under voluntary control. It is a very important ancillary mechanism, but is called into action only when danger threatens either from within or without (such as the pain produced by an examining finger). Any activity that puts any stress on the

abdominal muscles such as a sneeze, lift, cough—in fact, any exertion—is "beaten to it" by contraction of this muscle. If it were not so, life would be full of disasters. It responds to sudden demand, as does striped muscle elsewhere. The truth of this can readily be proved by very simple investigation. I have noticed that the voluntary contraction of the external sphincter is not so strong in some as that obtained by faradic stimulation of the pudic nerve or the response obtained by coughing.

FIGURE II. Photomicrograph of section of anal musculature of a child, showing relative sizes of sphincter muscles (×4). A = *sphincter ani internus*; B = circular muscle of the lower end of the rectum; C = columnar epithelium of the rectum; D = stratified squamous epithelium of the lower part of anal canal; E = striated muscle of the subcutaneous external sphincter; F = striated muscle of the superficial and deep external sphincters; G = point at which columnar epithelium meets stratified squamous epithelium.

The lower end of the internal sphincter can be easily palpated in the normal subject as a rubbery ring just above the slight groove between it and the subcutaneous external sphincter. It is normally in a state of tone, but gives way to gentle pressure.

In none of those cases in which I have removed the rectum has normal tone of this muscle been preserved, except in one in which I did a Hartman operation and in which it is presumed that the nerve supply to the lower part of the rectum and anus remained intact. Close investigation in a large series of cases will alone show whether any recovery of tone is possible, a recovery that can be due only to local nerve plexuses or to a hitherto unrecognized supply from some other source.

After conservative resection of the rectum I believe the patient has to depend on the voluntary external sphincters for control, and that this control is very inadequate when compared with the normal mechanism. I have never seen any reference by surgeons to the state of the internal sphincter muscle after operation.

The loss of the normal reflexes concerned in defæcation is an equally serious matter in that purgatives and enemata become necessary.

These comments on the conservative surgery of the rectum are made not in criticism of the procedure. I feel indeed that a normally situated anus with a damaged sphincter is preferable to an abdominal one; and all patients who have undergone this conservative operation have, on being questioned, stated a very definite preference for retaining an anus in the normal place, even if it should be imperfect.

CONCLUSIONS.

1. The non-striped internal sphincter plays a most important part in control of the anal sphincteric mechanism. Its significance has not been recognized in conservative surgery of the rectum.

2. Resection of the rectum must abolish its intrinsic nerve supply very extensively, if not totally.

3. Recovery of the tone must therefore be dependent upon the integrity of local nerve plexus and is therefore theoretically possible.

4. Those normal reflex changes which influence the tone of the internal sphincter become inoperative. Defæcation reflexes are lost in extensive resection.

5. The external sphincter plays an important part in voluntary and reflex responses to effort and in temporary control. Since it can be preserved together with its nerve supply in conservative surgery of the rectum, its retention is well worth consideration.

6. Any operation involving division of the ano-rectal ring results in poor sphincteric control.

7. The Hochenegg pull-through operation gives the most satisfactory results.

8. Impulses from the pelvic colon may give the patient warning of imminent action of the bowels, and this action may be temporarily restrained by voluntary contraction of the *sphincter ani externus*.

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TRAUMATIC INJURIES OF PERIPHERAL NERVES: II. AN ANALYSIS OF THE INCIDENCE IN 301 CONSECUTIVE CASES OF PERIPHERAL NERVE INJURIES.[1]

By SYDNEY SUNDERLAND,
Department of Anatomy and Histology, University of Melbourne.

IN this communication it is proposed to outline and briefly to discuss the incidence and distribution of the lesions occurring in 301 consecutive cases of peripheral nerve injuries which have been personally observed and investigated over the period 1941 to 1944 at an Australian military hospital and the Repatriation Clinic, Melbourne. This figure comprises the majority of patients with traumatic injuries to peripheral nerves who have been admitted to and discharged from hospital over this period, though there were some further cases which were not referred for consultation nor made available for investigation. Though the series is admittedly small in comparison with some reported by other investigators, it does represent, with reasonable accuracy, the total number of traumatic nerve injuries, and their relative incidence in individual nerves, among patients who have been admitted to a large base hospital in this country over a period of four years, and who have been investigated in considerable detail by a single observer.

The nerve lesions were, in general, of two types. The first comprised those due to gunshot wounds sustained in various theatres of war; for the sake of convenience these will be referred to throughout the text as gunshot lesions. The second group comprised those due to causes other than the above and embraced types which are common to civilian practice.

GENERAL INCIDENCE.

The lesions were distributed in the upper and lower limbs as follows:

Upper limb—	
Lesions of single nerves	200
Combined lesions	33
Lower limb	68
Upper limb-lower limb—	
Combined lesions	4
Total	305

There were four patients in whom the same nerve (brachial plexus, median, sciatic and lateral popliteal respectively) was injured on both sides. With correction for these double lesions the number of cases investigated is therefore reduced to 301.

In subsequent analyses the lesions involving nerves of both upper and lower limbs in the same individual will not be treated as combined lesions,

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but as separate lesions in the upper and lower limb respectively. The general incidence will then read as follows:

Upper limb—		
Lesions of single nerves	204	66·0%
Combined lesions	33	10·7%
Lower limb	72	23·3%
Total	309	

The incidence and distribution of the lesions due to gunshot wounds and other causes and relative to the two sides of the body are shown in Table I.

TABLE I.

Site.	Gunshot Wounds.				Other Causes.				Total.
	Right.	Left.	Total.	Percentage Incidence.	Right.	Left.	Total.	Percentage Incidence.	
Upper limb:									
Single	55	62	117	38·0	49	38	87	28·1	204
Combined ..	13	11	24	7·7	7	2	9	3·0	33
Lower limb	18	37	55	17·7	10	7	17	5·5	72
Total ..	86	110	196	63·4	66	47	113	36·6	309

Injuries of single nerves in the upper limb outnumbered combined lesions by six to one, while lesions in the arm were approximately three times as numerous as in the leg. In the upper limb single outnumbered combined gunshot lesions by five to one, though both occurred with approximately equal frequency on the two sides. In the lower limb, gunshot lesions were twice as numerous on the left.

Gunshot lesions of nerves (63·4%) greatly outnumbered those due to other causes (36·6%). Particularly was this so in the case of combined lesions in the arm and lesions in the lower limb, though this should occasion no surprise when it is remembered that in civil life it is only infrequently that the lower limb is so injured as to involve the sciatic nerve, while in the case of the upper limb the injuries are usually not sufficiently extensive or strategically placed as to involve more than one nerve (see below).

Single gunshot lesions in the upper limb, as opposed to those due to other causes, did not predominate to the extent that might be anticipated, and this may be accounted for in part by the greatly increased mechanization obtaining in this war which increases the possibility of injury from causes other than projectiles.

Lesions from causes other than gunshot wounds occurred more frequently on the right side, which, in the case of the upper limb, may possibly be accounted for by the predominance of right-handedness. In the upper limb single lesions were ten times more numerous than combined lesions.

THE INCIDENCE OF THE LESIONS IN INDIVIDUAL PERIPHERAL NERVES.

Lesions of individual peripheral nerves were distributed in the manner set out in Tables II, III, IV and V.

Brachial Plexus.

The brachial plexus lesions are shown in Table II, section (*a*), and in Table V.

The percentage incidence was as follows:

Gunshot wounds	4·8
Other causes	4·5
Total	9·3

TABLE II.

Upper Limb. Lesions of Single Nerves.

Nerve and Injury.	Right.	Left.	Total.		Sum Total.
			Gunshot Wounds.	Other Causes.	
(*a*) Brachial plexus:					
Gunshot wound + bone injury	2	1			
Gunshot wound	9	3	15		
Stretch uncomplicated	3	4			
Stretch—bone injury		3			
Cervical rib	2	2		14	29
(*b*) Radial:					
Gunshot wound + bone injury	11	9			
Gunshot wound	5	6	31		
Simple fracture	2	2			
Lacerations	3	1			
Compression	4	3		15	46
(*c*) Posterior interosseous:					
Gunshot wound + bone injury		4			
Gunshot wound		1	5		
Tension		1		1	6
(*d*) Median:					
Gunshot wound + bone injury	5	4			
Gunshot wound	9	9	27		
Lacerations	5	5			
Miscellaneous	4	1		15	42
(*e*) Ulnar:					
Gunshot wound + bone injury	4	11			
Gunshot wound	9	13	37		
Fractures about the elbow joint	8	7			
Lacerations	9	3			
Miscellaneous	10	5		42	79
(*f*) Volar digital:					
Gunshot wound	1	1	2		2
Total	—	—	117	87	204

Gunshot lesions and those due to other causes occurred in about equal proportions, but whereas the former were three times as numerous on the right side, the latter occurred twice as frequently on the left.

Radial Nerve.

The radial nerve lesions are shown in Table II, section (*b*), and in Tables III and V.

The percentage incidence was as follows:

	Gunshot Wounds.	Other Causes.	Total.
Single lesions	10·0	4·9	14·9
Combined lesions	3·9	1·6	5·5
Total	13·9	6·5	20·4

General.—Single lesions were almost three times as numerous as combined lesions; in the latter the radial was most commonly involved with the ulnar nerve. There was a slightly higher incidence on the right side. Gunshot lesions, both single and combined, were approximately twice as numerous as those due to other causes. In approximately 52% of all lesions there was an associated bone injury.

Gunshot Lesions.—Single lesions were almost three times as numerous as combined, though each occurred with equal frequency on the two sides. The number of single lesions associated with a fracture of the humerus was

TABLE III.

Upper Limb. Combined Lesions.

Nerve and Injury.	Right.	Left.	Total.		Sum Total.
			Gunshot Wounds.	Other Causes.	
Radial-median-ulnar:					
Gunshot wound + bone injury ..	1				
Gunshot wound		1	2		
Compression	1	1		2	4
Radial-median:					
Gunshot wound + bone injury ..	1	1			
Gunshot wound	1		3		
Simple fracture	1				
Lacerations		1		2	5
Radial-ulnar:					
Gunshot wound + bone injury ..	2	4			
Gunshot wound	1		7		
Simple compression	1			1	8
Median-ulnar:					
Gunshot wound + bone injury ..	2				
Gunshot wound	4	5	11		
Lacerations	3				
Miscellaneous	1			4	15
Median-posterior interosseous:					
Gunshot wound + bone injury ..	1		1		1
Total	—	—	24	9	33

twice, and of combined lesions, three times that in which there was no bone injury. The total number of cases associated with a fracture of the humerus was double that in which there was no bone injury.

	Right.	Left.
Gunshot wounds and fractured humerus	15 ..	14
Gunshot wounds without bone injury	7 ..	7

Lesions due to Other Causes.—Single lesions were three times as numerous as combined. There was a higher incidence on the right both for single and combined lesions. The number of simple compression lesions was twice that due to penetrating injuries and simple fractures, which occurred in about equal proportions.

Posterior Interosseous Nerve.

Posterior interosseous nerve lesions are shown in Table II, section (*c*), and in Tables III and V.

With only one exception lesions of the posterior interosseous nerve were due to gunshot wounds which, in a high percentage of the cases, fractured the upper third of the radius. In all but one case the lesions were on the left side and involved this nerve alone.

Median Nerve.

Median nerve lesions are shown in Table II, section (*d*), and in Tables III and V.

The percentage incidence was as follows:

	Gunshot Wounds.	Other Causes.	Total.
Single lesions	8·7 ..	4·8 ..	13·5
Combined lesions	5·5 ..	2·6 ..	8·1
Total	14·2 ..	7·4 ..	21·6

General.—Single lesions greatly outnumbered combined lesions. In the latter the median nerve was most commonly involved with the ulnar. There

TABLE IV.

Lower Limb.

Nerve and Injury.	Right.	Left.	Total.		Sum Total.
			Gunshot Wounds.	Other Causes.	
Sciatic:					
Gunshot wound + bone injury ..	3	12			
Gunshot wound	12	17	44		
Miscellaneous	2	3		5	49
Medial popliteal:					
Gunshot wound + bone injury ..	1				
Gunshot wound		2	3		3
Lateral popliteal:					
Gunshot wound	2	4	6		
Plaster compression	4	2			
Miscellaneous	1	2		9	15
Lateral cutaneous of thigh:					
Meralgia paraesthetica	2			2	2
Femoral:					
Traumatic at operation	1			1	1
Femoral-obturator:					
Gunshot wound		1	1		1
Inferior gluteal:					
Gunshot wound		1	1		1
Total	—	—	55	17	72

was a higher incidence on the right side. Gunshot lesions were again approximately twice as numerous as those due to other causes. In approximately 25% of the lesions there was an associated bone injury.

Gunshot Lesions.—Single outnumbered combined lesions. Single and combined lesions with a concomitant bone injury were, respectively, only one-half those in which there was no bone injury. This gives a distribution which was the reverse of that obtaining in the case of the radial nerve. The incidence on the two sides was substantially the same in each group, except in the case of combined lesions complicated by a fracture, which predominated on the right side.

Lesions due to Other Causes.—Single lesions were almost twice as numerous as combined, though both showed a higher incidence on the right.

Ulnar Nerve.

Ulnar nerve lesions are shown in Table II, section (*c*), and in Tables III and V.

The percentage incidence was as follows:

	Gunshot Wounds.	Other Causes.	Total.
Single lesions	12·0	13·6	25·6
Combined lesions	6·4	2·3	8·7
Total	18·4	15·9	34·3

General.—Single lesions were almost three times as numerous as combined lesions; in the latter the ulnar nerve was most commonly involved with the median. There was a slightly higher incidence on the right. Combined gunshot lesions were approximately three times as numerous as those due to other causes, though in the single lesions the latter slightly outnumbered those due to gunshot wounds. The net result was that gunshot lesions were slightly more numerous than those due to other causes. In approximately 38% of the lesions there was an associated bone injury.

Gunshot Lesions.—Single lesions were almost twice as numerous as combined lesions. Single lesions in which there was no injury to bone exceeded those in which there was a concomitant fracture. Lesions on the left side predominated in both groups, though the incidence was even higher in the latter. The number of combined lesions, with and without an associated injury to bone, was substantially the same, as was the incidence on the two sides.

Lesions due to Other Causes.—Single lesions were six times as numerous as combined lesions and, in contrast to the gunshot group, the lesions predominated on the right. The number of lesions associated with or following fractures about the elbow joint was approximately equal on the two sides, while that of lesions due to penetrating injuries and lacerations was three times greater on the right.

Leg.

Leg lesions are shown in Tables IV and V.

The percentage incidence was as follows:

Sciatic Nerve.

Gunshot wounds	14·2
Other causes	1·6
Total	15·8

Medial Popliteal Nerve.

Gunshot wounds	1·0

Lateral Popliteal Nerve.

Gunshot wounds	2·0
Other causes	2·9
Total	4·9

Lesions of the sciatic nerve greatly outnumbered those of the other nerves in the lower limb. In 33% of all sciatic lesions there was an associated fracture of the femur and in a further 4% a fracture of the pelvis. Gunshot lesions of the sciatic nerve were approximately nine times as numerous as those due to other causes in which, incidentally, the incidence was very low. Lesions of this type occurring in the absence of injury to the femur were

twice as numerous as those in which this bone was fractured. In both groups, particularly in the latter, the lesions were more numerous on the left side than on the right.

Of the remaining nerves in the leg the lateral popliteal was the most frequently involved, and here the commonest lesion proved to be compression following the application of a plaster.

A COMPARISON OF THE TOTAL INCIDENCE IN EACH OF THE MAJOR PERIPHERAL NERVES.

The total incidence for the major peripheral nerves has been summarized in Tables V and VI. In Table V a distinction has been drawn as to the side

TABLE V.

Nerve.	Due to Gunshot Wounds.						Due to Other Causes.						Total Number of Lesions.
	Single.			Combined.			Single.			Combined.			
	Right.	Left.	Total.	Right.	Left.	Total.	Right.	Left.	Total.	Right.	Left.	Total.	
Plexus ..	11	4	15				5	9	14				29
Radial	16	15	31	6	6	12	9	6	15	3	2	5	63
Posterior - interosseous ..		5	5	1		1		1	1				6
Median ..	14	13	27	10	7	17	9	6	15	6	2	8	67
Ulnar	13	24	37	10	10	20	27	15	42	6	1	7	106
Sciatic	15	29	44				2	3	5				49
Medial popliteal	1	2	3										3
Lateral popliteal	2	4	6				5	4	9				15

TABLE VI.

Percentage Incidence of Lesions of Individual Nerves whether Occurring Singly or in Combination.

Nerve.	Gunshot Wound.	Other Causes.	Total.
Plexus	4·8	4·5	9·3
Radial	13·9	6·5	20·4
Posterior-interosseous	2·0	—	2·0
Median	14·2	7·4	21·6
Ulnar	18·4	15·9	34·3
Sciatic	14·2	1·6	15·8
Medial popliteal	1·0	—	1·0
Lateral popliteal	2·0	2·9	4·9

of the lesion, whether it was single or combined, and whether it was due to a gunshot wound or to other causes.

Lesions due to Gunshot Wounds.—The incidence was approximately the same on the two sides for the radial and median nerves, but was greater on the left for the ulnar, sciatic, posterior interosseous and on the right for the brachial plexus.

The ulnar nerve was more frequently involved than any other. Lesions of the sciatic, median and radial nerves occurred in about equal proportions. The ulnar nerve was more frequently the common factor in combined lesions than either the median or radial nerves.

The number of radial nerve lesions, single and combined, associated with a fracture greatly exceeded that in which there was no bone injury, while the reverse obtained in the case of the median, ulnar and sciatic nerves.

Lesions due to Other Causes.—Single and combined lesions, particularly the latter, of the radial, median and ulnar nerves predominated on the right

side. Plexus lesions predominated on the left. Lesions of the ulnar nerve occurred twice as frequently as those of the median and radial nerves which were involved in about equal proportions. In combined lesions the radial, median and ulnar nerves were involved in approximately equal proportions.

SUMMARY.

An analysis has been made of the incidence and distribution of the lesions occurring in 301 cases of peripheral nerve injuries. Reference should be made to the text for detailed information relating to the incidence and distribution of the lesions in individual nerves.

The following significant points have emerged from this analysis:

1. In the upper limb injuries of single nerves outnumbered combined lesions by six to one.

2. Lesions in the upper limb were approximately three times as numerous as in the leg.

3. With the exception of brachial plexus lesions, gunshot lesions greatly outnumbered those due to other causes, though in the case of single lesions in the upper limb the former did not predominate to the extent that might be anticipated.

4. Gunshot lesions of the brachial plexus and those due to other causes occurred in about equal proportions, but whereas the former were three times as numerous on the right, the latter occurred twice as frequently on the left.

5. Gunshot lesions of the sciatic nerve were approximately nine times as numerous as those due to other causes, where, incidentally, the incidence was very low.

6. The percentage incidence of concomitant bone injury in the various lesions was as follows: radial, 52; median, 25; ulnar, 38; and sciatic, 37.

7. Lesions due to gunshot wounds:

(*a*) Ulnar nerve lesions predominated. This nerve was more frequently the common factor in combined lesions than either the radial or median nerve.

(*b*) Lesions of the radial, median and sciatic nerves occurred in about equal proportions.

(*c*) The incidence was approximately the same on the two sides for the radial and median nerves, but was greater on the left for the ulnar, posterior interosseous and sciatic, and on the right for the brachial plexus.

(*d*) Gunshot lesions, when totalled, occurred with equal frequency on the two sides in the upper limb, but in the leg they were twice as numerous on the left.

(*e*) The number of radial nerve lesions, single and combined, associated with a fracture greatly exceeded that in which there was no bone injury, while the reverse obtained in the case of the median, ulnar and sciatic nerves.

8. Lesions due to other causes:

(*a*) Lesions of the ulnar nerve were double those of the median or radial nerves, which were involved in about equal proportions.

(*b*) In combined lesions the radial, median and ulnar nerves were involved in approximately equal proportions.

(*c*) Lesions occurred more frequently on the right in the case of the radial, median and ulnar nerves and on the left in plexus lesions.

ACKNOWLEDGEMENT.

I wish to express my thanks to the Director-General of Medical Services for permission to publish this paper.

SLOWNESS AND FAILURE OF BONY UNION AFTER FRACTURES AND OSTEOTOMIES OF THE PROXIMAL OR TROCHANTERIC END OF THE FEMUR.[1]

By THOMAS KING,
Saint Vincent's Hospital, Melbourne.

THIS paper deals with the long period, three to nine months, that is so often spent in bed by patients before osseous union is strong enough for them to become ambulant on crutches and before they can bear their full weight, after fractures and osteotomy operations at the upper end of the femur (so-called lateral, intertrochanteric or extracapsular fractures of the femoral neck and subtrochanteric osteotomies). It also deals with those patients who are unfortunate enough to develop absolute non-union after a high femoral osteotomy, designed to cure the pain and instability of the hip joint following ununited medial fractures of the femoral neck, osteoarthritis *et cetera*.

SLOW UNION IN HIGH FRACTURES OF THE FEMORAL SHAFT (EXTRACAPSULAR, LATERAL OR INTERTROCHANTERIC FRACTURES OF THE FEMORAL NECK).

Non-union is very rare, and in the last ten years only two patients so affected have passed through my hands, and one of these was cured by bone grafting (see Figure IX); but slow union is the rule. The three to nine months' splinting in recumbency often provokes the complications that occur in the nursing of the aged, especially mental deterioration, loss of sphincter control, and above all "sacral pressure". These sometimes constitute insuperable difficulties for the nursing of the fracture if it is to be continuously immobilized by splinting in traction, large plaster spica apparatus, Roger Anderson splint, or any other method requiring recumbency ("chaining to the bed"). As a result of these difficulties there are cases in which the treatment of the fracture must be abandoned. The number of deaths that results from the effects of this fracture compared with those from the medial or intracapsular type is much higher. It is a more serious accident because the area of fractured bone is much larger, the bone edges and surfaces are more jagged, and the adjacent femoral shaft is often splintered irregularly and large spiral fragments are displaced. This is shown by the heavy bloody infiltration into the buttocks. As a consequence of the displacement, which may be considerable, pain and shock are greater, and these generally cause a higher death rate (22% as against 8·7% for intracapsular fractures, according to Siris and Ryan). The only advantage that this fracture has over the intracapsular type is that non-union is rare; but delayed union is common, especially if traction in abduction, which is perhaps the most popular method of treatment, is adopted. Traction together with suspension of the limb in a sling or other splint provides only partial immobilization of these high femoral shaft fractures; it effects a separation of the compressed cancellous bone at the base of the femoral neck, and leaves a wedged-shaped cleft or cavity there. Unless this is allowed to fill in with solid bone during some months of continuous traction, the typical *coxa vara* deformity that existed before treatment began, is resumed, if in a serious fracture weight bearing

[1] Accepted for publication on December 22, 1944.

begins before six months have elapsed, and this may not be long enough. As the aged object to weight-relieving walking callipers, they should use crutches for a further three to six months after the union appears to be sound; but even these precautions do not always avoid a late development of *coxa vara* deformity if the adductor muscles are very strong or the patient is very big, and the new bone at the fracture site still soft.

On the other hand, internal fixation of these fractures by the Blount and Moore blade apparatus, nail and plate of Jewett or Hawley, and other similar methods results, I believe, in more rapid osseous union because of the good reduction, firm apposition of fractured surfaces and absolute immobilization provided by the internal fixation. And of course internal fixation can be a life-saving procedure because the problem of decubitus in the elderly is eliminated. Watson-Jones, in the latest edition of his book, states that the method has possibilities and adds that it is still on trial; but I think it will become the established method. The principal danger of operation is the possibility of wound infection. The operation is not a severe one to the patient, as it can be done in about one hour, and the manipulations and operative procedures are not shock producing. The principle of this operation is the avoidance of external splinting; it therefore differs from the plating of fractures of the shafts of long bones, in which the only advantage is the perfect apposition obtained. In the case of the shaft of the femur, prolonged recumbency and splinting must be continued after a plating operation. A plating operation on the shaft of the femur is dangerous because the exposure of the shaft of the femur requires a deep dissection of the thigh. As for a Stader or any other form of splinting which requires that the bones be transfixed by quarter-inch nails above and below the fracture site and attached to some form of external holding apparatus, I consider they are too dangerous, the danger consisting of the infection along the pins that must inevitably occur in a certain proportion of cases.

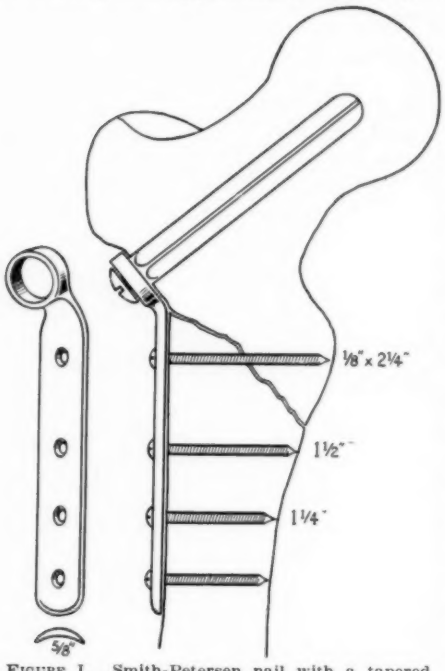

FIGURE I. Smith-Petersen nail with a tapered head which fits the reamed ring of the plate for holding fractures of the upper end of femur. The Blount plate is also excellent.

Technique of Nailing and Plating Fractures in the Trochanteric Region of the Upper End of Femoral Shaft.

Fractures at the base of the neck and between the tip of the greater trochanter and lesser trochanter can be dealt with most satisfactorily with the Smith-Petersen nail, and no supplementary plate is required. In this type of fracture it is usual for the frontal view to show no gross *coxa vara* displacement, merely a V-shaped opening at the fracture site; but the clinical

examination discloses gross external rotation of the limb, with the foot lying horizontally outwards in the bed, and any movements, whether passive or active, result in extreme pain. The lateral X-ray examination, if it can be done, confirms this, and may reveal shattering of the femoral shaft; and if this is the case, a plate must be used with the nail.

When the fracture is situated distal to the level of the lesser trochanter, we can still use the Smith-Petersen nail firmly driven into the *caput femoris* and attach to the nail head a plate; this plate is attached to the upper femoral shaft, thereby absolutely immobilizing these high fractures of the femoral shaft. This treatment of these troublesome and common fractures is comparable to the great advance in the treatment of intracapsular fractures by the Smith-Petersen nail, which has absolutely superseded pre-existing methods. The transfixing methods for extracapsular fractures have not to contend against the ever-present possibility of non-union or degenerative changes in the *caput femoris* that must always exist with intracapsular fractures. Rarely do these degenerative changes occur in trochanteric type of fractures. The only dangers are those of operative introduction of infection and subsequent disaster, or the effect of one hour's general anæsthesia on an elderly patient; and this latter is not a serious objection.

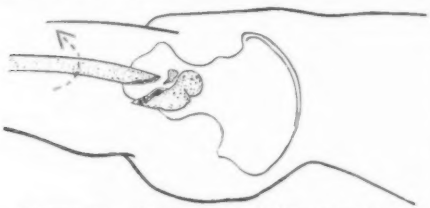

FIGURE II. Nailing and plating operations for upper femoral shaft fractures cannot be performed if the limb is internally rotated, as for medial or intracapsular femoral neck fractures. Internal rotation forces the femoral shaft medially and to the front of the fractured surface of the trochanteric fragment.

Reduction.—Shortening and *coxa vara* should be overcome on the orthopædic table by traction and abduction, but the external rotation ("eversion") in most cases should not be corrected by internal rotation of the limb, as is carried out for this important deformity in intracapsular fractures. Figure II shows that no matter how much the limb is rotated internally, it can have no effect on the external rotation of the upper fragment—that is, shaft of femur and femoral neck proximal to the fracture. Consequently the effect of internal rotation of the limb as a whole is to separate the two fragments which we wish to plate together. Accurate reduction is obtained by allowing the limb distal to the fracture to remain externally rotated about 45° from the vertical plane, and thereafter correcting any differences in the angles of rotation between the fractured fragments by pulling forward the trochanteric fragment (see Figure III) with a sharp hook. I have noticed that the upper fragment is always rotated more externally than the lower, which means that the shaft of the femur is anterior or in front of the trochanter and femoral neck.

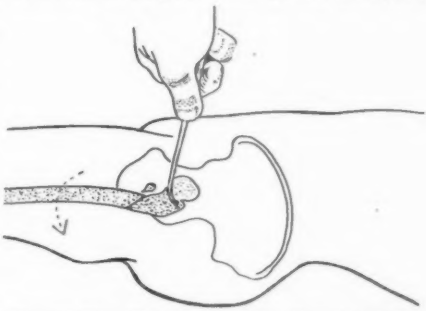

FIGURE III. When the limb is allowed to roll outwards into full external rotation the fractured surfaces become approximated.

The Nailing of the Upper (Trochanteric) Fragment.—The Smith-Petersen nail is introduced under X-ray control, and the only difficulty for those accustomed to introduce the nail with the femoral neck internally rotated

is that the angle of declination is forwards 25° to 15° instead of backwards. The nail must not be driven in absolutely its full depth; at least one to one and a half inches of the head end of the nail should stand out, otherwise it will be impossible to attach the plate. If the nail head has been inadvertently driven home, then the nail must be extracted about one and a half inches.

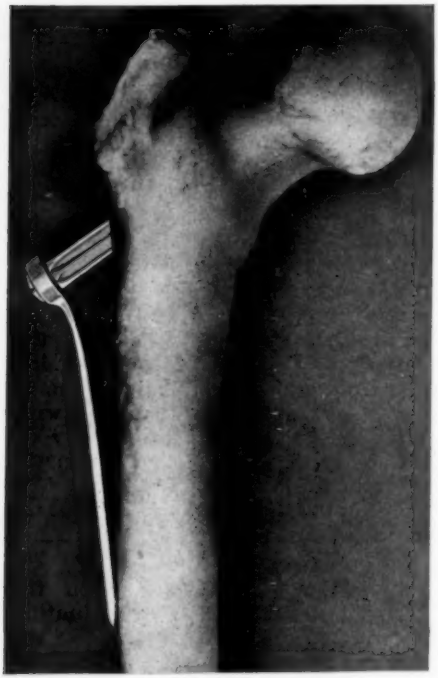

FIGURE IV. The nail head must not be driven home before the plate is attached. It should stand out about one inch from the outer surface of the femoral shaft. This photograph shows that the angle between the ring and plate is incorrect, and must be altered as shown in Figure V.

Attaching the Plate to the Femoral Shaft and Nail.—The importance of the assistant's hooking forwards the proximal fragment in the region of the base of the great trochanter is now evident. This causes accurate reduction and allows the plate to be fitted between the femoral shaft and the nail head, which still remains not knocked fully into the bone. At this stage we can consider the modification which was made to the Hawley plate for me through the cooperation of C. B. McPherson.[1] Surgeons have criticized the Hawley plate because the plate ended in a proximal cap, which was attached by a screw to the Smith-Petersen nail, and this screw sometimes became undone, with consequent separation of the nail and plate. It also was liable to rotation, and thereby might allow displacement at the fracture site. More recently a strong spring washer was placed under the cap so that the nail and plate were ensured of permanent fixation by the screw; and I have used this once with the Zimmer model, but it cannot be compared with the plate shown in Figure I. I use an instrument which has a taper fitting between the nail head and the plate, and as this is about the strongest fitting in engineering, especially when fixed down by the screw, there is now little danger of separation of the plate and nail. The plate is attached by the reamed ring to the tapered head which is standing out about one inch (Figures IV and VI). We must now rely on a "straight eye".

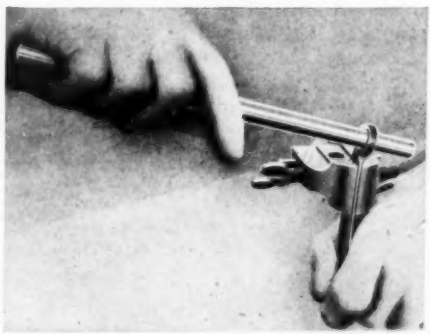

FIGURE V. The "ring-plate angle" is altered by holding the plate in a vice, and the tapered ring is firmly engaged by the tapered rod. The ring should not be gripped by a pliers or wrench because it may be distorted when the neck is bent.

[1] C. B. McPherson, 41 Spring Street, Melbourne, supplied the plates, nails and screws and also the Blount plates.

If the plate is not parallel with the femoral shaft, then the angle between the plate and reamed ring is bent accordingly. Levers, pliers or vices should not be used to alter this angle, as they may convert the absolute circle into a slight ellipse, and thereafter it will not be possible to attach the ring to the tapered nail head; but this does not apply if the ring is fitted to the head or the tapered rod (mandril) is used. The two tools used for bending the angle are shown in Figure V—that is, a mandril and jeweller's vice, the former to fit into the ring and the other for holding the plate. The mandril can be replaced by another taper-headed nail and the vice by holding the plate in a sterile towel. The nail, with plate firmly fixed and parallel with the femoral shaft, is driven into the *caput femoris*; but, of course, the assistant should be holding forward the upper fragment with a hook behind the great trochanter. A Lowman's clamp was used to hold the plate against the femoral shaft, but is seldom required because the plate is driven hard against the shaft as it is attached firmly to the nail head. Drill holes one-sixteenth of an inch less than the diameter of the machine screws (wood type of screws should never be used as they "burst" the bone and have no proper hold) are made through both cortices of the femoral shaft. The diameter of the nail and screws is measured by a slide calliper. Stainless steel machine screws held in a screwdriver are now fitted to the

FIGURE VI. Now the plate is parallel with the femoral shaft. The ring itself only lies parallel with the curved surface in the subtrochanteric fossa when the nail is placed higher. (See Figure XXII.)

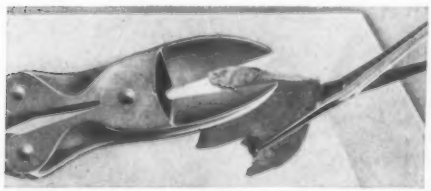

FIGURE VII. A wrong method of chopping up bone grafting material removed from the iliac crest and ilium. The blades of the Stille bone forceps tend to direct the fragments into the air and onto the operating theatre floor.

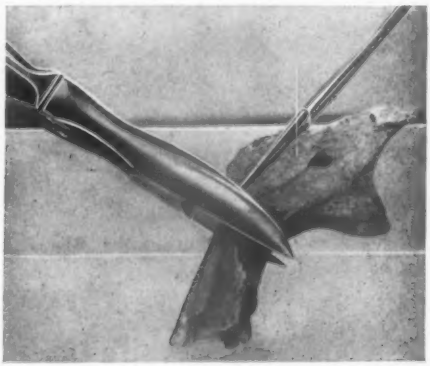

FIGURE VIII. Correct method of chopping up iliac bone, so that the oblique cutting blades of the forceps are directed downwards towards the dish.

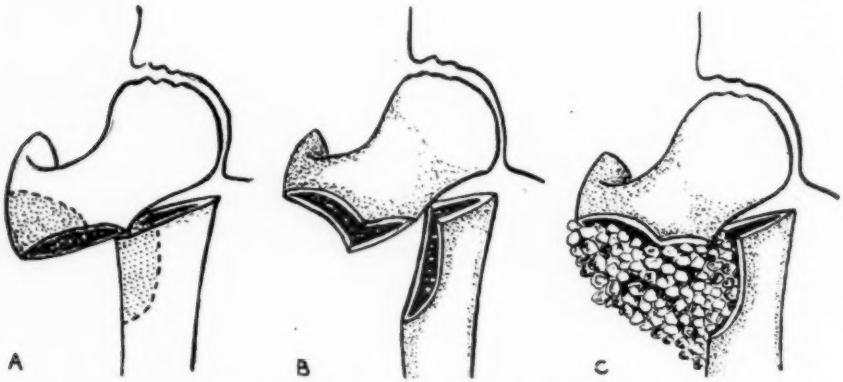

FIGURE IX. A: Spongiosa bone grafting for non-union after subtrochanteric Lorenz-McMurray osteotomy for osteoarthritis of the hip *et cetera*. The painful weight-bearing area is in the cranio-lateral sector; the osteotomized femoral shaft has been displaced medially. Dotted area shows plans of the "guttering" between the two ununited fragments. B: The "guttering" has been thoroughly executed and the medullary cavity of the shaft opened, whilst the cancellous bone of the upper or trochanteric fragment is widely excavated. C: The gutters are packed with small bone pieces from the chopped up iliac fragments and patiently hammered into a more or less macerated and homogeneous form. It is hardly possible to introduce too much new bone.

plate and holes. It is surprising what a strong attachment of the plate to the bone is thereby obtained, although failure of the screws to hold in the bone has been reported. It is essential to have the screw engaged in both cortices, especially the cortical bone in the inner surface of the femur, and it does not matter if they are too long. I am now putting them in on the skew, and this makes a very strong hold.

FIGURE X. M.H., aged forty-five years. Non-union, October 16, 1941; subtrochanteric osteotomy, March 12, 1941. Immobilization by large spica.

SLOW AND ABSENT OSSEOUS UNION AT THE SITE OF THE FEMORAL OSTEOTOMY.

A slow transformation of the calcified granulation tissue into bone is the rule (four to six months), especially after the Lorenz-McMurray operation (displacement of femoral shaft under the *caput femoris*) as compared with the Schanz type of operation in which the medullary cavities are together (see Figure XIII); the tardy new formation of bone is a special feature in those cases in which very little of the osteotomized surfaces were in apposition, because the femoral shaft had been displaced far under the femoral neck into the ideal position mechanically for transferring the weight under the acetabulum and as far as possible medial to the painful cranio-lateral section of the *caput femoris* and

adjacent pelvic articular rim (see Figures XXVIII, XXIX and XXX). Absolute failure of the divided bone to unite occurred after seven out of one hundred and twenty operations, and the resulting disability was far worse than that which the patient complained of before operation; for example,

FIGURE XI.

FIGURE XII.

Figure XI: M.B., aged thirty-one years. Osteotomy for pain in both congenitally dislocated hips. Operation left hip, December 9, 1942 (united); right hip, August 25, 1943 (non-union). Both treated by sling and traction.

Figure XII: M.B., aged thirty-one years (see Figure XI). Operation, spongiosa graft, April 19, 1944; osseous union, July 31, 1944 (three months). Spica immobilization.

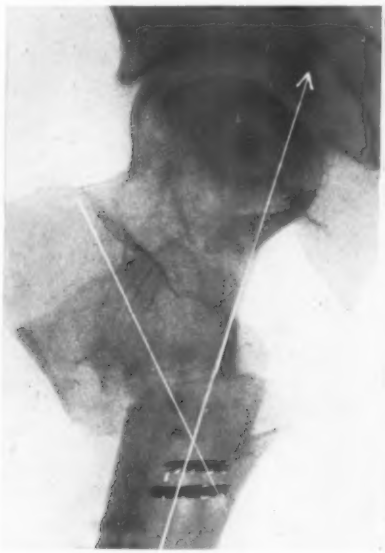

FIGURE XIII.

FIGURE XIV.

Figure XIII: F.B., aged fifty-three years. Painful osteoarthritis after successful nailing for medial femoral neck fracture. Schanz osteotomy, November 28, 1941.

Figure XIV: F.B., aged fifty-three years (see Figure XIII). March 4, 1942, non-union of osteotomy. Immobilization by sling and traction.

the unfortunate individual with an ununited femoral osteotomy must add this to the misery of an ununited fracture of the femoral neck.

The disability consists in increased pain, sense of weakness in that hip (it amounts to collapse when weight bearing is attempted) and a gross

Trendelenburg lurch of the pelvis and trunk on trying to walk with weight on the affected hip. It is sad news for the patient, after lying in splints for about six months, to be told that the operation of osteotomy has resulted in non-union. The mental anguish of the patient will be transferred to the surgeon in some cases, whether he likes it or not. As tardiness and non-union are such important disadvantages of the otherwise excellent operation of high femoral osteotomy, we can only hope that they may be eliminated or their frequency reduced by more adequate immobilization with internal fixation, which allows active movement of the limb as a whole, thereby improving the nutrition, but absolutely preventing movement between the bones at the osteotomy site. Table I shows that most of the patients were immobilized by slinging the osteotomized limb in abduction with about five pounds of traction.

TABLE I.

Analysis of Seven Patients with Non-Union out of One Hundred and Twenty Sub-Trochanteric Osteotomies.

No.	Reason for Osteotomy.	Age.	Type.	Post-Operative Splinting.	Treatment of Non-Union by Bone-Grafting.	Splinting After Bone-Grafting.	Result of Bone-Grafting.
1	Osteoarthritis.	63	Lorenz - McMurray 15/10/40	Sling and traction.	None.	—	—
2	Osteoarthritis (Figure X).	45	Schanz 12/3/41	Large spica.	None.	—	—
3	Osteoarthritis (Figures XIII-XVI).	53	Schanz 28/11/41	Sling and traction.	19/8/42	Large spica.	Osseous union.
4	Non-union of fractured neck femur.	49	Lorenz - McMurray 6/12/41	Sling and traction.	None.	—	—
5	Non-union nailed fractured neck femur.	55	Lorenz - McMurray 5/5/43.	Large spica.	None.	—	—
6	Osteoarthritis (Figures XVII-XIX).	45	Lorenz - McMurray 7/7/43.	Large spica.	30/7/44	Sling and traction.	Osseous union.
7	Congenital dislocalocation of hip (Figures XI and XII).	35	Schanz 25/8/43.	Sling and traction.	19/4/44	Large spica.	Osseous union.

(1) Ninety patients were immobilized by sling and traction, and thirty in large plaster spicas. (2) There were seven patients with non-union and four of them had been immobilized by sling and traction and three by plaster spicas. (3) Three out of the seven patients with non-union were operated upon by bone-grafting, and osseous union resulted.

Some may say that this would cause delayed or non-union, but it is much less severe on the patient than the large plaster spica which can be intolerable to big fat patients; and as non-union also occurred when patients had been immobilized in plaster spicas, I have continued in slinging, but now have turned to internal fixation. Is the nail and plate method of internal fixation strong enough to maintain immobilization of the osteotomized fragments until osseous union results and at the same time allow movement of the limb as a whole? We must remember that the upper fragment is attached to the pelvis by the ligaments and glutei muscles, whilst the lower fragment is attached to the pelvis by the long muscles, such as the adductor, quadriceps and hamstring muscles. The internal fixation is required to hold the upper fragment perched in the correct position on top of the shaft and not to hold the whole limb below the osteotomy to the upper fragment. The plate does this and at the same time avoids movement between the osteotomized

fragments. If the osteoarthritic hip is so stiff that there is very little movement, there is a greater strain at the osteotomized site on the steel blade. A plate has only a lot of torsion strain to deal with when there is very little movement in an osteoarthritic joint. The Schanz operation must not be used for the osteoarthritic hip which is stiff, otherwise a knock-knee develops, because the limb below the osteotomy is fixed in abduction because the upper fragment cannot be adducted.

Technique of Nailing and Plating after Subtrochanteric Osteotomy.

The great objection to the osteotomy operation is the prolonged recumbency—three to six months—and the discomfort of the splinting, as most surgeons use the large plaster spica apparatus, during that period. I do not think that many patients over sixty years of age are able to undergo

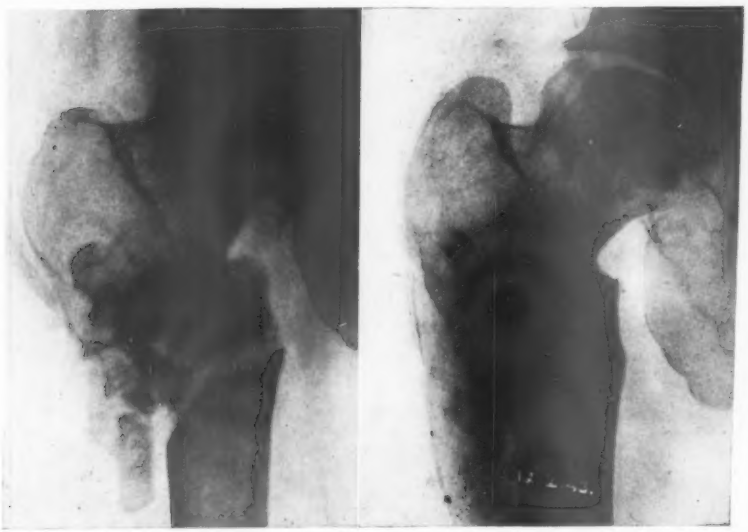

FIGURE XV. FIGURE XVI.

Figure XV: F.B., aged fifty-three years (see Figure XIV). September 16, 1942, one month after spongiosa graft operation on August 19, 1942.

Figure XVI: F.B., aged fifty-three years (see Figure XV). February 12, 1943, sound osseous union. Spica immobilization. No disability.

this ordeal, and later the swollen limb, stiff knee and general bodily weakness are serious objections. In these circumstances the internal fixation of the osteotomized fragments by the nail and plate is a tremendous step forward, as external splinting is unnecessary and the patient may be ambulant, or at least free to move around in bed. Patients are only in hospital for two to three weeks, and are then sent to a convalescent home. Before this method of internal splinting was devised the proposition of Watson-Jones—arthrodesis by an extraarticular introduction of a Smith-Petersen nail—was the most gentle and acceptable method; unfortunately the practical results did not correspond with the ideal of the conception.

The application of the plate to the nail head after the nail has been inserted has some technical difficulties because of the bends and angles that exist after the osteotomy has been performed. Therefore we must plan almost the exact site, line and angle of the osteotomy. This is worked out before

the operation on the skiagram; and the plate is bent by the surgical maker to the shape required as the steel must be heated for bending. A tracing of the skiagram is made on a sheet of paper, and a second tracing is made and then cut out with a scissors from another piece of paper. If the latter is superimposed on the former, a very accurate representation of the osteotomy and the position of the altered fragments afterwards is obtained. The plate is bent according to the plan. If, for example, the distance between the centre of the blade ring to the first bend of the plate (see Figure XXVII) is one and a half inches, then the osteotomy site should be exactly one and a half inches from the centre of the nail, which was partly driven into the *caput femoris*. The plate ring is fitted to the nail head, which is standing out about one inch from the subtrochanteric fossa, and now the nail head and accompanying plate are driven firmly in. At the same time the rest of the blade

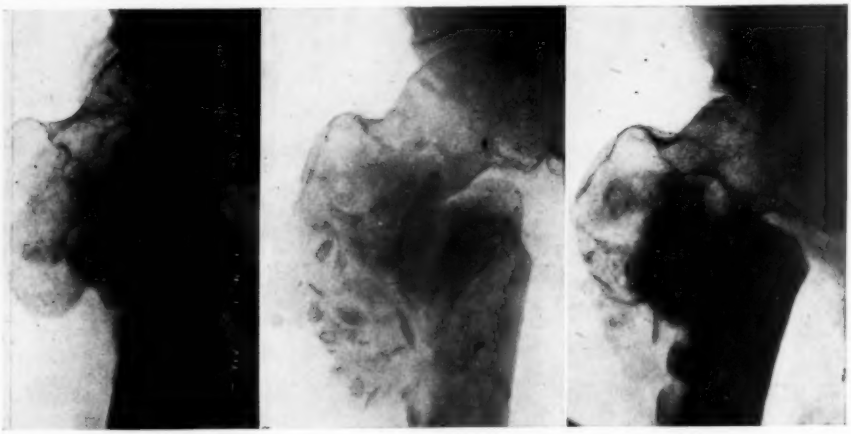

FIGURE XVII. FIGURE XVIII. FIGURE XIX.

Figure XVII: H.E., aged forty-five years, January 17, 1944. Operation, July 7, 1943, for painful osteoarthritis. Immobilization by large plaster spica. Non-union.

Figure XVIII: H.E., aged forty-five years (see Figure XVII). Spongiosa graft operation, July 30, 1944, although a sinus was present.

Figure XIX: H.E., aged forty-five years (see Figure XVIII). Sound osseous union despite infection after bone grafting operation and discharge of some of the bone fragments. Immobilization in sling and traction.

pushes the femoral shaft inwards. The "fit" should be almost perfect; and the blade is now screwed onto the femur.

The plating of a Lorenz-McMurray osteotomy is fairly easy, if the plate is bent beforehand and the osteotomy is performed to plan; but the Schanz operation is more difficult, unless the upper fragment can be hooked down into the adducted position. If it cannot, then we must fully abduct the leg below the site of osteotomy, and this makes the application of the plate rather difficult.

Schanz Osteotomy.

The Schanz operation should be used instead of the McMurray type when there is a pathological or old congenital dislocation of the hip causing painful osteoarthritis. The McMurray type does not transfer the weight medial to the acetabulum when there is a dislocation. The site of osteotomy should be below (distal to) the level of the lower border of the acetabulum (see Figure XXIII); a wedge should be removed with the base not less than one and a half inches as a rule. This can be worked out easily before

operation by the tracing paper models, and the plate be ready bent for the angle before operation. This operation can be done for the relief of the shearing on an ununited fracture (see Figure XXV, A). The object is to convert the shearing force into a more or less vertical and non-shearing force, through the fracture site; this is shown in Figure XXV, D.

Non-Union of Fractures and Osteotomies of the Proximal Fragment of the Femur Treated by Spongiosa Bone Grafting.

The pelvis is raised from the operating table by broad sand bags (six inches high); otherwise it is difficult to expose the site of non-union. If we fail to remove at least half of the length of the iliac crest and adjacent ilium, an insufficient amount of bone will be obtained for packing the ununited

FIGURE XX.

FIGURE XXI.

FIGURE XXII.

Figure XX: E.K., aged seventy-three years. Lunatic, unmanageable. July 20, 1944 (four weeks old fracture).

Figure XXI: E.K. Smith-Petersen nail and plate. Operation, July 26, 1944, five weeks after fracture.

Figure XXII: E.K. September 9, 1944 (six weeks after operation; note the exuberant amount of new bone, especially near lesser trochanter). Patient fell over again, but nail and plate not affected, except that proximal screw slightly extruded.

bone area. For this purpose it is not possible to remove too much bone. Packs and levers are used to hold back the iliac and glutei muscles. A corrugated rubber drain is finally inserted. The site of non-union is approached by an incision that is somewhat more anterior than the usual lateral one. After the bone is exposed by cutting through the *tensor fascia femoris* and *rastus lateralis* muscles, a curved lever is placed medial to the femoral shaft and just below the base of the *calcar femoralis* in the region of the lesser trochanter. Thereby the non-union area is seen from the front. A half-inch gouge is now used to cut a gutter in the bone proximal and distal to the ununited area. This gutter should be cut as large as possible. The stripping of muscle and leverage required for this step to be carried out may cause some shock that does not usually occur with most extraarticular operations on the hip joint. The gouge is driven deeply into the trochanteric fragment so that bleeding cancellous bone is exposed, and this, of course, also

applies to the femoral shaft. Meanwhile the fresh bone obtained from the ilium is chopped into small pieces (no larger than maize) by a Stille bone-cutting forceps, and if the oblique section of the jaws is made to point downwards towards a dish there is no danger of the pieces of bone flying all around the operating theatre. The bone chips consist largely of cancellous (spongiosa) bone, but also of the thin cortical layer of the ilium. Figure XV shows how generously this bone is supplied to the ununited area. The chopped up bone is hammered into the medullary cavities of the trochanteric and femoral shaft entities of the non-union with the blunt and round head of a Stille chisel until it forms a paste. After that the bone is packed in front and to the lateral side. Finally, any respectable-looking bone that had been cut out of the ununited area for providing the gutter, is chopped up as the fresh iliac bone was; but the size of the chips is smaller—that is, about the size of wheat grains—because this bone is denser. The wound is now closed, and when this is completed a bulge should be evident on the surface, indicating that a large mass of bone-grafting material lies underneath. Immobilization is by a plaster spica or by the sling and traction. Table I and the skiagram in Figure XVI show that this method promises favourable results, although the method has been used in only three out of seven cases; but every patient operated on obtained sound osseous union; also I have used this method only once and with success in the treatment of a patient with non-union following a fracture of the upper femoral shaft (trochanteric fracture). There is a tremendous advantage in

FIGURE XXIII. Unreduced dislocation of hip. A large piece of the posterior rim of acetabulum is displaced above the *caput femoris*. A 60° wedge, the apex distal to the lower margin of the acetabular cavity, should be removed.

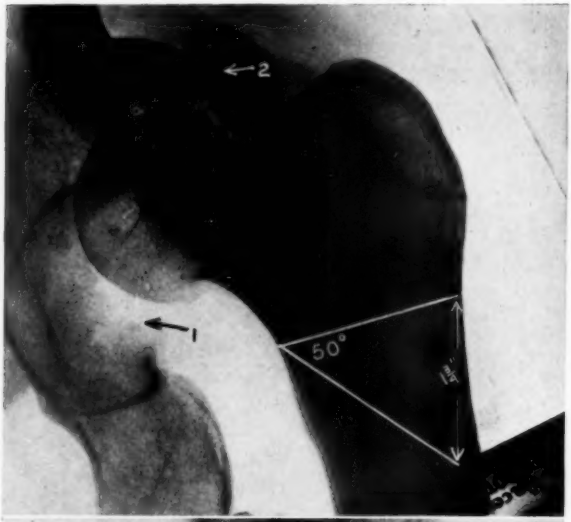

FIGURE XXIV. After wedge osteotomy and internal fixation, future weight bearing is now transferred medially to the *caput femoris* and against the pelvic wall, thereby curing pain, Trendelenburg lurch and weakness.

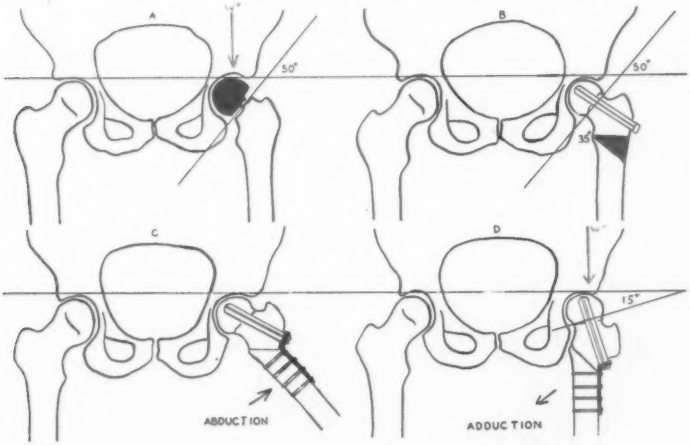

FIGURE XXV.

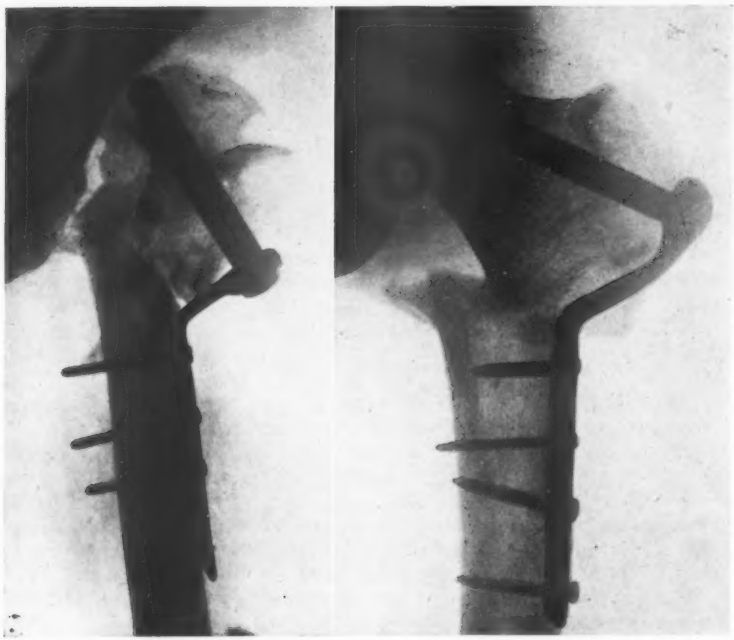

FIGURE XXVI.

FIGURE XXVII.

Figure XXVI: M.P., aged twenty-four years. Painful osteoarthritis of congenital dislocation of hip; the 60° bone wedge was removed and chopped up and packed over inner side. Plate and nail immobilization.

Figure XXVII: Lorenz-McMurray osteotomy for painful osteoarthritis; "goose neck" (Blount) bending of plate. Compare with Figure XXXI. A good type of osteotomy (see Figure XIII) for all cases is one in which the upper fragment is partly adducted (not as strongly as in Schanz type), and lower fragment is partly displaced underneath (not so far as in McMurray type, which favours delayed union).

the method of bone grafting by spongiosa and chopped up bone, and this is that should infection supervene there is no need for the surgeon to despair. He certainly knows that infection following a solid bone graft—for example, tibial twin saw bar of bone—is fatal to the vitality of the transplanted bone, which in the circumstances will be discharged or usually removed as a sequestrum, and non-union result; but infection after the spongiosa grafting method usually results only in a few pieces of the transplanted bone being extruded as dead bone. Furthermore, it is possible to use the spongiosa method even in the presence of potential or slight pre-operative infection. For example, patient number 6 in Table I had a sinus which could not be cleared up; in the circumstances the sinus was excised at operation and the spongiosa operation was performed. Certainly infection supervened, but osseous union resulted after six months (see Figures XVII, XVIII and XIX).

FIGURE XXVIII. FIGURE XXIX. FIGURE XXX.

Slow union after McMurray osteotomy for painful osteoarthritis (skiagram seven and a half months after operation). Patient, aged thirty-eight years, still in hospital.

Figure XXVIII: December 6, 1944. Lateral view shows no sign of bony union.

Figure XXIX: December 6, 1944. Usual antero-posterior view shows no absolute evidence of osseous union.

Figure XXX: December 6, 1944. An oblique view shows that osseous union is fairly well developed.

Spongiosa Graft for Non-Union Combined with Nailing and Plating.

The nail and plate are attached first, and then the front aspect of the femur is guttered at the fracture site, and not on the lateral aspect as in Figure IX. The front aspect is easily exposed by external rotation of the limb and insertion of a curved lever on the medial side of the upper end of the femur. A complete freeing of the two ununited ends is unnecessary and takes too long, and is harmful because it results in a disturbance of the blood supply. The bone that is removed is cut into chips and packed all around, as well as any excess of spongiosa bone that was not required for filling the gutter.

PRIMARY OSTEOTOMY OR NAILING, OR BOTH TOGETHER, FOR RECENT INTRACAPSULAR (MEDIAL) FRACTURES OF THE FEMORAL NECK.

Nearly 25% of nailed intracapsular fractures result in failure of osseous union. This result is not good certainly, but it is better than the 100% failures from traction—for example, the Hamilton Russell sling method—as I have never up to the present seen osseous union obtained by this principle

nor seen any published results, and the almost equally bad results of the Whitman plaster spica immobilization. Whitman himself never published end-results, although he was often requested to do so. He stated that he could not because he had never treated a great number of patients, and those he had treated were not followed up. We now know that even in that group of fortunate individuals in whom osseous union resulted by the Whitman method the stiff knee and swollen limb and prolonged convalescence were severe disabilities; and that these objectionable complications do not occur after the nailing operation.

It is unfortunate that after osseous union has been obtained by nailing, only perhaps 25% of patients are absolutely free from traumatic osteo-arthritis, caused by degenerative changes in the *caput femoris*; but this complication is not always disabling. There can be no doubt that it is the fracture and not the nail that causes this complication, because similar changes often follow sooner or later after such injuries and disabilities as congenital dislocation of the hip, Perthes's disease, traumatic dislocation of the hip, even falls ("bruised" hip) *et cetera*. However, most of the patients who have obtained osseous union do not complain of the occasional stiffness and pain in the affected hip, caused by the traumatic osteoarthritis. McMurray, Ettore and others arrived at the view that a primary subtrochanteric femoral osteotomy should be substituted for nailing. They stated that nailing failed in many cases because of non-union or painful osteoarthritis, and suggested that osteotomy, which all orthopædic surgeons recognized as a cure (in most cases) for these disabilities, might just as well be done for a recent fracture as for the cure of a "failed nailing operation" or painful osteoarthritis. The main objection to their stand is the trying convalescence of three to six months in the large plaster spica apparatus which was required until osseous union at the osteotomized site took place and thereafter the stiff knee *et cetera*, compared with the nailing operation. For a recent or old fracture this objection no longer holds now, because the immobilization can be secured by internal fixation with the nail and plate or Blount apparatus, instead of the plaster spica or other methods of splinting. It remains to be seen whether in the future we shall nail the *caput femoris*, then as a matter of routine perform a subtrochanteric osteotomy and finally immobilize the osteotomized fragments by a plate attached to the nail or the Blount apparatus, but not rely on nailing alone without the osteotomy. In these circumstances, of course, the nailing or Blount fixation of the *caput femoris* is necessary only in order to have a fixed point to hold the blade or plate. It becomes incidental that the fractured femoral neck is also immobilized in an anatomically correct position. Once the fractured femoral neck has been nailed there is not a great deal of technical difficulty; but there is, of course, some greater operative danger to the patient (if over fifty years of age) in the performance of a subtrochanteric osteotomy, attaching a plate to the femoral shaft and nail head. Thereby we satisfy the views of

FIGURE XXXI. M.B., aged sixty-seven years. Lorenz-McMurray operation for ununited fracture of neck of femur. Plate "angled" at bends, instead of "goose necked" (Blount) as in Figure XXVI. This type of plate is difficult to remove later as it becomes enmeshed by new bone, the formation of which it may hinder.

two important schools—that is, of Smith-Petersen who nails the fractured head, and McMurray who uses the osteotomy alone. Up to the present I have nailed all recent intracapsular fractures, but would do the combined nailing osteotomy and plating operation if the fracture was over three weeks old, the bone was comminuted, or the patient was a young manual labourer. After three to four weeks it is often too late for nailing, and if the patients are under fifty to sixty years of age and healthy, they are best treated by osteotomy because of the chance of degenerative changes in the *caput femoris*, which has been deprived of a blood supply for four weeks, and is not likely to survive nailing alone.

CONCLUSION.

The treatment of intertrochanteric fractures becomes as satisfactory from the nursing point of view as that of intracapsular fractures, if we use the method of internal fixation by nail and plate or similar apparatus; osseous union is rapid compared with traction methods because of good reduction and immobilization; the stiff knee *et cetera* are avoided.

After the otherwise generally satisfactory operation of subtrochanteric osteotomy (Lorenz-McMurray or Schanz type), delayed or non-union and the most objectionable three to six months' splinting in bed are serious difficulties that are largely avoided by the internal fixation with nail and plate.

Non-union of intertrochanteric fractures (rare) and of high femoral osteotomy (seven out of 120 operations) can be dealt with by spongiosa bone grafting (obtained from iliac crest) and immobilization by internal splinting with nail and plate.

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Surgical Technique.

A KNOT-TYING TECHNIQUE.[1]

By W. J. C. Wells,
Carterton, New Zealand.

The tying of knots with forceps is more time-consuming than the ordinary method of using the fingers, but a simple method is suggested for those occasions where the use of forceps is desirable.

It consists in making the first loop of the knot on the forceps before passing the ligature round the tissue to be tied. This manœuvre can be accomplished in the space

Figure I.

Figure II.

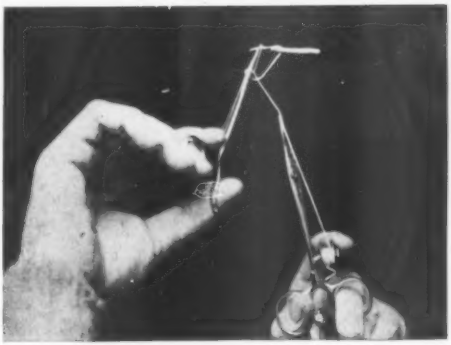

Figure III.

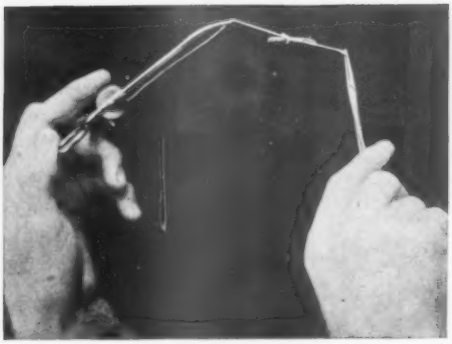

Figure IV.

of time that the assistant is cutting the last ligature and is picking up the next pair of forceps for tying.

If the ligature spool is held in the palm, and the end of the ligature between the thumb and index finger, it is then easy to make the first loop of the knot with forceps. When the ligature is now passed behind the pedicle and grasped in the forceps, the first part of the knot is already tied.

A simple instrument is depicted. It makes easy the use of a non-touch technique where it may be considered obligatory.

[1] Accepted for publication on March 3, 1945.

Case Reports.

PLEXIFORM GANGLIONEUROMA OF THE SMALL INTESTINE.[1]

By JOHN S. MACMAHON AND GEOFFREY F. S. DAVIES,
Sydney.

Clinical History.

(John S. MacMahon.)

D.G., A FEMALE, aged sixteen years, was first seen in consultation for Dr. Rupert Sheldon at Saint Joseph's Hospital, Auburn, New South Wales, in August, 1940.

Her previous history was that ever since she was a small child she had never passed a normal motion; her motions were always loose, with small fæcal lumps. From about the age of two she experienced, practically daily, attacks of abdominal pain accompanied by vomiting, the longest interval of freedom from pain being possibly a week. She commenced school when five years old, but was often sent home crying and complaining of abdominal pain. During these attacks a large lump, like a ball, which could quite easily be felt with the hand, would appear.

At the age of eight, after an attack of severe abdominal pain accompanied by vomiting and diarrhœa, she underwent an operation at a public hospital. The records briefly state: "Acute appendicitis; tuberculosis of mesentery (extensive); appendicectomy performed."

The patient remained in hospital for a period of two weeks, and was then treated by the application of ultra-violet rays to the abdomen, and had several courses of injections of tuberculin. She obtained no relief and still suffered from attacks of abdominal pain, colicky in nature.

Latterly the pains had become worse and the attacks more frequent. She could hear noises in her abdomen during spasms and could feel the lump rising. She had three to four loose motions *per diem*. Her appetite was poor and she frequently vomited.

On examination the patient was a muddy-complexioned debilitated young girl, considerably under weight. On her abdomen was the thickened scar of a previous Battle's incision.

A rounded tumour extending up to the umbilicus was visible in the lower part of the abdomen. It was firm on palpation and freely movable. Visible peristalsis was present and loud borborygmi were audible during spasms of pain. No X-ray or other examinations were carried out as laparotomy was decided upon.

Operation was performed on September 6, 1940. The abdomen was opened by a right paramedian incision. A large tumour of the terminal part of the ileum was found. It was coiled up on itself, giving a rounded appearance. The tumour of the bowel had a definite edge and terminated sharply about two and a half inches from the ileo-caecal junction. The mesentery of the affected area was swollen and œdematous, being about one inch in thickness. No enlargement of the regional glands could be detected.

The affected area of bowel was resected, and a side-to-side anastomosis was carried out between the ileum and caecum. The only difficulty in the operation was that the ligatures tended to cut through œdematous swollen mesentery, necessitating oversewing in order to secure hæmostasis. There was nothing suggestive of an old abdominal tuberculous infection. Convalescence was uneventful. The patient was discharged from hospital on September 29, 1940.

Her health has improved remarkably, and her general appearance is totally different. She has gained considerably in weight and is now of fresh complexion, the muddy discoloration of her skin having totally disappeared. Her motions are formed and her habitus is regular. There has been no recurrence of her symptoms, and she is now able to earn her own living.

[1] Accepted for publication on December 18, 1944.

FIGURE I.

FIGURE II.

FIGURE III.

FIGURE IV.

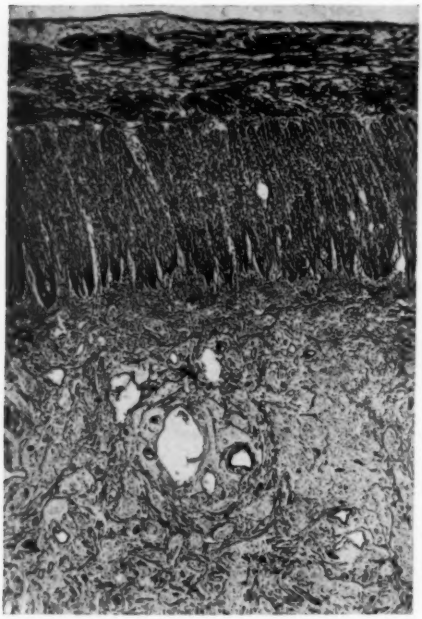

FIGURE V.

FIGURE VI.

FIGURE VII.

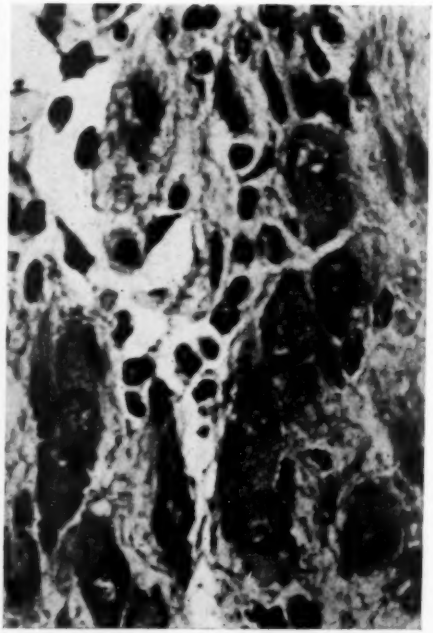

FIGURE VIII.

Pathological Report.

(Geoffrey F. S. Davies.)

Macroscopic Appearances.

The resected portion of the small intestine is 33 inches long. About two-thirds of it is two inches (5·0 centimetres) in diameter and this portion is firm and of a very pale creamy-brown colour. Running under the serous surface there are white, raised, cord-like lines which, although not nodular, resemble lines of tumour infiltration. There are also some minute subserous nodules 1·0 or 2·0 millimetres in diameter, as well as two others which are more plaque-like and are 7·0 millimetres and 13·0 millimetres in diameter respectively. On removal of pieces of the bowel wall for section, the tissue is found to cut with cartilage-like resistance and all layers of the wall are found to be thickened. The mucosa is engorged and the villi are much thickened. The *muscularis mucosæ* is about 3·0 millimetres thick, its inner margin is indefinite, but its outer limit is distinct. The submucosa is firm, white and 4·7 millimetres thick in its thickest part.

The inner circular muscle coat is 5·0 millimetres thick and the outer longitudinal coat 2·7 millimetres thick; the latter is of a pale brown colour, yet darker than any other coat except the mucosa.

About one-third of the resected portion is of more normal diameter. The submucous veins in this part are engorged.

The mesentery is also very thick and indurated. Its surface is white, opaque and lumpy. It cuts with resistance and the lobules of adipose tissue are seen to be separated by white tumour-like infiltration.

Figure I shows the specimen removed at operation. The coil of intestine in the lower part of the illustration shows the appearance of the outer surface of the affected portion of bowel.

Figure II shows a transverse section through the affected part of bowel. The mucous membrane is dark; the muscle coat is indistinct; the wall is greatly increased in thickness (especially the submucosa). The upper part of the illustration shows adipose tissue in the mesentery.

Figure III shows the interior of the affected bowel. The villi are conspicuous; the wall is thick, but less so than in other parts.

Figure IV shows one of the plaques of growth projecting from the serous surface.

Microscopic Appearances.

In one section the villi are found to be very thick and œdematous and are infiltrated by small round cells. In the submucosa there is also considerable cellular infiltration, but many of the cells appear to be large nerve cells. Others are probably inflammatory in type. The muscular coat is very œdematous, and between the muscle bundles there are well-defined bundles of fibrillary tissue which resembles nervous tissue. In these there are occasional clumps of ganglion cells. In the muscularis, which is very thick and œdematous, there is similar cellular infiltration. Section of the mesentery shows numerous well-defined zones of fibrous tissue which resemble fibrosed nerves.

Figure V shows a transverse section through the affected bowel. Above is the serous surface; the longitudinal and circular muscle coats are spaced out by œdema. The lower part of the illustration shows the fibrocellular tissue which is present between the muscle coat and the mucous membrane (not included in this illustration).

Figure VI shows the œdematous muscle under higher magnification.

Figure VII shows the fibro-cellular tissue which accounts for the increased thickness of the submucosa. Most of the tissue is nervous, but nerve cells are not conspicuous.

Figure VIII shows nerve cells situated in the mucous membrane close to the *muscularis mucosæ*.

Acknowledgement.

The photographs and photomicrographs were taken by Mr. N. Newson, of the Department of Pathology, Royal Prince Alfred Hospital, to whom our thanks are due.

FIBRO-SARCOMA OF THE LOWER JAW.[1]

By IAN HAMILTON,
Adelaide.

Clinical History and Pathological Findings.

M.D. WAS seventeen years of age when he first reported in to the Royal Adelaide Hospital Cancer Clinic in December, 1931, with a history that six years previously, in 1925, he had felt a small swelling of the left side of the lower jaw with his tongue. It was not superficially noticeable, but he had discovered it in that manner. It had remained in the same condition until about November, 1930, when he had toothache and the lump began to grow. A tooth was drawn, but the swelling did not subside. However, it had been painless and stationary since that time—that is, for about a year.

Examination at that time showed a hard bony tumour expanding the left lower jaw along the horizontal ramus. It stood out sharply posteriorly, but passed gradually into normal tissue at the left of the *symphysis mentis*. It was neither tender nor painful. The posterior teeth in that region had been extracted, and it appeared that it was mainly the outer surface of the mandible that was affected. The mass extended from 1·0 centimetre below the zygoma 1·5 centimetres anterior to the angle of the jaw forwards, but ill defined almost to the *symphysis mentis*. There were no secondaries evident and otherwise the patient appeared well. A biopsy had been taken on February 2, 1931, and had been reported on as showing a "myeloid (giant cell) sarcoma"

FIGURE I.

FIGURE II.

(Figure I), and an X-ray picture on January 22, 1931, showed that there was an immature tooth behind the lower left second bicuspid tooth and a large rarefied area in the left mandible, but no intimate connexion could be established between the two (Figure II).

Therefore, at that stage a diagnosis of giant cell tumour of the left lower jaw of six years' standing was made and it was decided to treat him with deep X-ray therapy. He was a difficult patient to treat, and, despite several promises to attend, he did not come in for treatment until March, 1932, when between March 8 and 18 he was given a course of deep therapy. On May 12, 1932, there was no evidence of reaction and the tumour was unaltered. A further course of deep therapy was given from June 3, 1932, until June 16, 1932, and on June 21, 1932, he reported and there was some swelling of the left cheek, some redness over the tumour, particularly over its anterior half. The tumour seemed smaller. Further treatment was postponed. By June 29, 1932, there was some bronzing and desquamation over the anterior two-thirds of the tumour and some ulceration which had occurred, had healed. He did not attend again despite several requests until July 18, 1933, when the tumour was possibly smaller and its wall harder, and an X-ray examination showed expansion of the bone since the previous examination, but without any breaking through the tables

[1] Accepted for publication on January 30, 1945.

of the bone. On February 15, 1934, examination showed the tumour a little more sharply defined and firm, but an X-ray picture did not reveal any particular change (Figure III).

An X-ray examination on October 5, 1934, was reported on by the radiologist as follows: "The expanded portion of the mandible does not show the coarse trabeculation of a giant cell tumour. It is possible that an old tumour has been replaced by normal appearing bone." (Figure IV.)

He did not attend the clinic again until June 18, 1938, when the tumour appeared enormous and measured 6·0 centimetres in diameter. The skin moved slightly over the mass, which was firm and attached to the jaw. Inside the mouth there was a soft

FIGURE III.

FIGURE IV.

mass on the side of the mandible extending from the site of the molar teeth anteriorly to the canine teeth. The left lower canine and the anterior premolar teeth were still *in situ*. The posterior part of this mass was covered by a slough. He was referred to me for surgical treatment, and after several consultations it was decided to excise

FIGURE V.

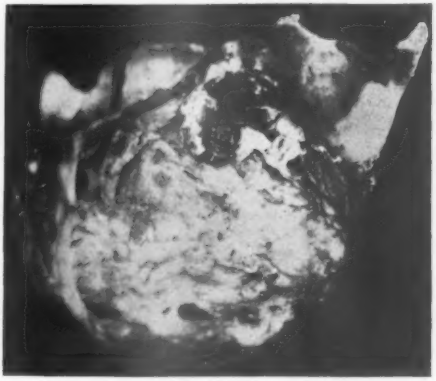

FIGURE VI.

the left half of the lower jaw. A biopsy was reported on as showing an "osteolytic fibro-sarcoma".

On January 28, 1938, I assisted Sir Henry Newland when the tumour was excised with almost the whole of the left half of the mandible (Figures V and VI). The upper part of the ascending ramus, condyloid and coronoid processes were left *in situ*. Anteriorly the jaw was divided at the *symphysis mentis*. The skin was saved and used to cover the gap. Following the operation good healing occurred, with an excellent cosmetic effect compared with the extreme disfigurement of his face with the huge

tumour of the jaw before operation. He again failed to keep appointments for follow-up, but was quite well for over a year.

In April, 1939, he noticed a small lump anterior to the left ear, and in May, 1939, this was 3·0 centimetres in diameter, hard and fixed deep to the skin, apparently being a swelling of the remains of the ascending ramus of the jaw. An X-ray examination at

FIGURE VII.

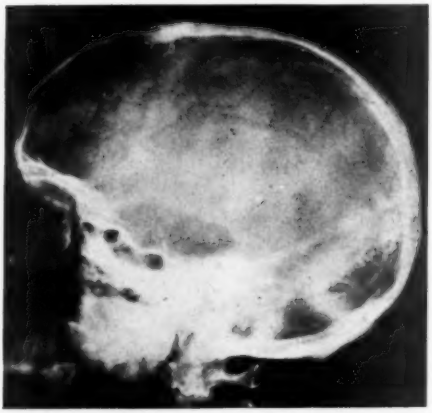

FIGURE VIII.

this stage showed the remains of the left mandible with a neoplastic bony mass growing in the tissue of the left cheek below the zygoma. (Figure VII.)

The recurrence grew rapidly, and by July, 1939, it was decided that the recurrent tumour was surgically irremovable because there was "an extensive recurrence which extended upwards under the zygoma into the temporal fossa, backwards to the mastoid

FIGURE IX.

FIGURE X.

process, forwards to the external angular process of the frontal bone and downwards below the level of the lobe of the ear. The swelling was very fixed." The growth was increasing in size fairly quickly, and deep X-ray therapy was given from July 18, 1939, until August 30, 1939. There was considerable reaction to the X rays, and by October, 1939, the mass had diminished very considerably. In April, 1940, there was a discrete hard lump half an inch in diameter lying in the subcutaneous tissue in the left

submaxillary region. I excised it and the histopathological examination showed a "fibro-sarcoma the size of a cherry".

He was involved in a motor accident in April, 1940, in which he was concussed and had a dislocation of the right hip, a fracture of the middle third of the left femur and a fracture of the head of the right tibia. He recovered from these injuries and went back to work; but the mass in the left temporal region gradually increased in size again, the left eye became closed and the lids œdematous. There was considerable proptosis by the end of 1940, and by December, 1940, the left nostril was blocked. (Figures XI and XII.) No further treatment was advised except that on February 18, 1941, a mass of growth two inches long was protruding from the left nostril and was cut off. It grew rapidly again and within a month was protruding fully two inches. He became delirious and died on March 19, 1941, nearly sixteen years after first noticing the tumour.

The autopsy showed that the tumour had invaded the frontal temporo-sphenoidal and orbital bones and penetrated the left temporo-sphenoidal lobe of the brain. It had penetrated the frontal sinuses and left antrum and had extended down the left nostril,

FIGURE XI.

FIGURE XII.

where a tumour the size of a billiard ball protruded. There were secondary deposits in the lower lobes of each lung.

X-ray photographs taken on August 27, 1940, and December 6, 1940, showed an extensive bone-forming neoplasm in the infratemporal fossa and surrounding structures and the left antrum was invaded. (Figures VIII, IX and X.)

A review of the sections showed without doubt that the tumour was an osteogenic sarcoma of the fibrous type.

Comment.

I have reported the case fully because of the several features which lend themselves to valuable discussion. Only rarely do we see such a tumour, and the extreme length of the history must make it almost unique. Undoubtedly the original diagnosis of a giant cell tumour of the jaw was at fault. This perhaps can be accounted for by too small a piece, probably only just off the surface of the lump, having been taken for the histopathological examination. It is absolutely essential in all biopsies to get a good cut of thoroughly representative tissue. However, given that the report on February 2, 1931, that it was a giant cell tumour was correct, I believe that the proper treatment at that time would have been resection of the jaw, and had it been reported on as a sarcoma of the jaw this applies even more forcibly. Giant cell tumours and fibro-sarcomata of bone are not particularly radiosensitive, and, as this case shows, some sarcomata of bone take a very long time to metastasize even locally, so that in such a case early bold radical surgery might have given a cure. At no stage did this tumour react really favourably to full doses of deep X-ray therapy, and at the end it almost seemed that its character had become much more aggressive, possibly stimulated by the irradiation.

Surgery in Other Countries.

[In this column will be published short résumés of articles likely to be of practical value from Journals published in other countries and not readily accessible to surgeons in Australia and New Zealand.]

A SUGGESTED TREATMENT FOR CLAW-FOOT.

K. Daubenspeck (Cologne): *"Korrektur des Klauenhohlfusses durch Fixation der langen Zehenbeuger an den Grundphalangen"*, *Zeitschrift für Orthopädie*, Volume lxxiv, 1943.

THE chief deformity in the condition known as "claw-foot" is a great increase in depth of the longitudinal arch of the foot, together with a supination of the heel, which is not shared by the fore part of the foot. The foot therefore besides appearing shorter than normal, also shows some degree of rotation on its long axis. The toes are strongly hyperextended at the metatarso-phalangeal joints and equally strongly hyperflexed at the interphalangeal joint. In old-standing cases actual dislocation at these joints may occur.

The condition is generally associated with some previous central nervous system injury or disease, but in this paper it is the local condition which is under discussion. The main initiating factor in this local condition is a paralysis of the interossei muscles, with consequent failure of their short flexor action, and an unrestrained extensor action at the basal joints. The long flexors, not being attached to the first phalanges, are not able to counter this extensor action, but they do, as a result of it, produce the strong downward flexion of the terminal segments. The long extensors are not placed mechanically so as to prevent this hyperflexion. All these deformities can be reduced by manipulation and the normal relations restored temporarily in cases in which permanent contractures are not present.

After a number of attempts to correct these mechanical defects by operative measures had been reported without much success, Daubenspeck devised an operation modified from Pauwel's work which was previously the most promising procedure existing. Daubenspeck's technique is as follows.

The patient lies prone on the table with the feet over the end, and an incision is made across the sole two millimetres proximal to the interdigital fold. This incision, which lies immediately over the heads of the metatarsals, is carried proximally over both lateral and medial borders of the foot for one to two centimetres. The flap of skin and fat is dissected up and reflected for about one centimetre. The tendon sheaths are all exposed and split longitudinally. A beginning being made with the little toe, which is the most difficult, the tendons are then anchored to the first phalanges in the following manner. Both flexor tendons are pulled up and transfixed with strong silk or thread as far proximally as possible. The silk being tied, with its two ends left of equal length, the deep wall of the tendon sheath and the periosteum are cut longitudinally on the plantar surface of the first phalanx and dissected just sufficiently away from the mid-line to each side to allow of a good transfixion with the silk without too much loosening of their attachment to the phalanx. A specially devised small raspatory, about five millimetres wide and having a right-angled bend at two centimetres from its end, is necessary for this step. All five toes are prepared in this manner. Then, a start again being made with the little toe, the two ends of the silk are carried through the two tendon sheath-periosteal flaps respectively, travelling from the mid-phalangeal line outward in each case. Fatty tissue attached to the outer surface of the tendon sheath should be avoided in the suture as far as possible. The ends of the silk are brought out of the wound, and with an assistant flexing the toe to its utmost extent possible, they are firmly tied, the tendon thus being put in a subperiosteal fixation to the plantar surface of the phalanx. The other toes are similarly treated in succession, and the skin wound is closed. Full flexion at the basal toe joints must be carefully maintained throughout the whole of these stages, after which the foot and ankle are enclosed in plaster, which is left in place for four weeks. Thereafter massage and careful movements are directed towards eliminating the "pointing" of the foot. Some eight days after the removal of the plaster, weight bearing is commenced, and the foot soon regains its normal angle to the leg.

In children and adolescents the time is relatively short in which the *pes cavus* flattens out, the adduction of the foot disappears, and eventually the varus position of the heel gradually returns to normal. The time taken for the last-mentioned change can be shortened by the use of an appliance to hold the heel everted and the sole flat. The sole plate of this appliance should be designed so as to keep the fore part of the foot

somewhat abducted on the hind part. The foot will very soon become entirely normal in power and function.

The results of this operation have been very happy. It is indicated in all cases of claw-foot, whether congenital in origin or secondary to some central nervous system condition. The only contraindication occurs in those cases in which arthrogenic contractures are present in the toe joints. If the toe joints cannot be brought by passive manipulation into their normal positions, the operation cannot succeed. Sometimes, however, in an apparently unfavourable case the condition can be made suitable for operation by a series of correcting plasters applied under anæsthesia.

Flexion of the toes at the interphalangeal joints is of course lost; but this is of no great moment; and so far in no case has any tendency for hyperflexion to occur in the basal joints been observed. A final advantage of the operation lies in the fact that, if it should fail, no damage of any sort has been done to the patient, who is only in the same condition as before.

ARTHUR E. BROWN.

THE TECHNIQUE OF PERINEAL PROSTATECTOMY.

H. Viethen (Berlin): *"Über die Technik der perinealen Prostatektomie"*, *Der Chirurg*, Volume xv, 1943, page 393.

ALTHOUGH as early as 1914 Wildbolz selected the perineal approach as the method of choice in dealing with prostatic enlargements, and although the consequent lowering of mortality has been published by him and by others, it is only in very recent years that the operation has gained many adherents. One reason for the increase may be that many urologists are now turning away again from per-urethral resection, owing to the transient nature of its results.

Until 1939 Viethen himself used either the suprapubic or the per-urethral method almost entirely. Since then, of 123 operations, 100 have been performed by the perineal route, and in the other 23 the suprapubic approach has been used only because of some special indication, such as an already existing suprapubic opening.

Following 100 perineal prostatectomies there were five deaths, seven strictures, seven cases of partial or complete incontinence and three fistulæ. But if only Viethen's last 50 cases are examined, there is only one death, one stricture and one case of partial incontinence. The stay in hospital averaged forty-four days, as against the fifty-one days required after the suprapubic operation; and the healing time for perineal operations was thirty-eight days, while the average for suprapubic operations was forty-four.

Viethen is not concerned with the statistical side of so small a series; but has as his object to describe the technique used, which he considers a suitable one for almost all forms of prostatic enlargement.

Spinal anæsthesia is used throughout. The patient is placed in an exaggerated lithotomy position with the thighs flexed as close to the abdominal wall as they can be made to go. This brings the operation plane up to an angle of 30° to 50° from the horizontal and greatly facilitates access. Any of the various well-known incisions, if properly used, will give good results. The tendinous central point of the perineum is identified and cut, as is also the underlying recto-urethralis muscle. The anterior wall of the rectum can then be separated from the anterior and under part of the prostatic capsule, and the prostate lies free for enucleation. The gland can be drawn down by any of the instruments designed for the purpose, and any of the described incisions in the capsule may be used. After enucleation of the adenoma, the bladder outlet is sutured to the urethral stump after the method of Wildbolz and Kirschner and the capsule is sewn over it. A self-retaining catheter provides drainage.

Those who dislike the perineal operation explain their attitude on a number of grounds. They claim that it is extremely difficult to find the correct tissue plane for the enucleation; that sphincter damage and incontinence follow it too frequently; that there is undue danger of a perforation into the rectum, with consequent fistula and sepsis; that secondary hæmorrhage and stone formation are likely to follow it; that strictures form more frequently after it; and that it leads to loss of sexual potency.

Viethen takes these objections *seriatim*. He agrees that there is difficulty, especially for the inexperienced, in finding the correct tissue plane. The key to success lies in careful isolation of the central tendinous point, and the following points in technique are helpful. Palpate the perineum along the median raphe, in the same way as one would the vertebral spines. Anteriorly is the bulbo-cavernosus muscle, lying superficially, and helpfully indicated by an inlying catheter. Where this turns in deep behind the symphysis the palpating finger can recognize a part characterized by fat and loose tissue. The central point is directly deep to this, and it becomes apparent when the skin is reflected. To left and right of it the index and middle fingers can easily and safely work forward into the perineal fossæ. These fingers push back the fat and connective tissue in the direction of the rectum. The central tendon is now cut in its

upper part, close to the muscles of the bulb, which are lightly pressed forward by a blunt hook. Section of the urethro-rectalis muscle is recognized by the reddish retracting fibres which become visible on the deeper cut surface of the central tendon. Complete section of these fibres is evidenced when the bulb and the *transversus perinei* muscle retract forwards so that the wound almost gapes open to its depths, and at the bottom of it the bowel wall is seen closely applied to the anterior and under side of the prostatic capsule. If the above described dissection encroaches forward on the bulb, there is free bleeding, which must be checked by suture, and the incision carried some millimetres further back.

With regard to incontinence, Viethen states that this will occur only following injury to both the urinary sphincters. The role of the internal sphincter is admittedly a relatively small one, but it can temporarily at least hold the bladder outlet closed. Viethen emphatically agrees with Kirschner that "extractors" of the Young type contravene all sound principles for the conservation of the sphincters, for when they are used the prostatic surfaces and the bladder wall are distorted out of their normal relations in a way which does not occur when traction forceps of the "Musieux" type are used. The dissecting scissors must always be kept closely applied to the prostate if damage to the sphincter is to be avoided. A preliminary infiltration of the plane between the prostate and its capsule with twenty to forty cubic centimetres of saline solution with adrenaline will make an astonishing difference in the ease of enucleation. A transverse incision being made through the capsule, the rectum is first separated from the prostate by finger dissection, and the finger can then be swept forward to isolate the whole gland. In this way the fibres of the external sphincter are left as nearly as possible undamaged. It is not necessary to leave prostatic tissue round an intact urethra, which can be cut or torn through. The better the anatomical technique, the less the danger to the sphincters.

Perforation of the rectal wall can occur either immediately by faulty technique or secondarily owing to interference with its blood supply. Should it happen during the operation the rent must be sutured and the *sphincter ani* stretched. Most surgeons are content to break off the operation and be satisfied with a suprapubic operation later on. Kirschner, however, advocates going on with the operation as planned, and he has done this twice successfully. It is advisable after the separation of bowel from prostate to examine the bowel wall. As it is not possible to use a rectal finger for this, Viethen has devised a Hegar's dilator mounted on a handle, so that something resembling a bimanual examination can be carried out.

Secondary hæmorrhage and stone formation are theoretical rather than actual dangers. In the series of Wildbolz, Kirschner and Viethen it does not occur. Stricture development is on the other hand a real possibility, as it is after the suprapubic operation. It is not likely to occur if the surgeon develops a technique which removes the adenoma only, leaving the compressed prostatic tissue *in situ*. If the prostatic tissue is inflamed or injured, then scar tissue will form and is likely to contract. Viethen, in his last twenty cases, has abandoned the practice of suturing the bladder outlet to the urethral stump. It is simpler to suture the prostatic tissue left to the incision in the capsule. This does not delay healing, nor apparently bring with it any added likelihood of stricture formation or of incontinence.

With regard to impotence, it is unfortunately a frequent result of perineal prostatectomy, and to only a slightly lesser extent of suprapubic prostatectomy. The reason for it is not easy to ascertain. Viethen inquired of forty patients in his series on this point, and is able to report only a very small percentage in whom full potency was retained. The patients, however, did not seem to be depressed about it, the disadvantage being regarded as a minor one in comparison with the relief from the previous urinary disabilities.

ARTHUR E. BROWN.

AN EXPERIMENTAL INVESTIGATION OF THE VALUE OF GLUCOSE AND INSULIN ADMINISTRATION FOR SUPPORT OF LIVER FUNCTION.

G. Walther (Breslau): "*Experimenteller Beitrag zur Frage der Leberschutzbehandlung mit Glucose und Insulin*", *Klinische Wochenschrift*, Volume xxii, November, 1943, page 698.

THE efficiency of liver action is closely bound up with its function of glycogen storage. And since in severe grades of liver damage the power of making and storing glycogen is greatly decreased, liver function is still further depressed, and a vicious circle is created which it is the aim of effective therapy to avoid or break. Although glycogen can be built up from various carbohydrate and amino-acid substances, glucose offers much the best results, and is the normal substance to use in cases in which the liver has been under strain, or is likely to be under strain as a result of procedures planned.

During the last two decades it has become the practice to give small doses of insulin with the glucose, on the theory that while large doses of insulin undoubtedly break down the glycogen reserves, small doses act in a contrary sense and build them up. Walther's thesis is that this practice has no clear evidence to back it.

Brentano, in 1939, after many careful experiments, stated that insulin in even small doses decreased the glycogen store in the liver. And he also quoted the work of the physiologists Meyerthal and Gerstenberg, who anastomosed the pancreatico-duodenal vein to the *vena cava*, thus forcing the endogenous insulin from the pancreas to flow through the systemic circulation before it could reach the liver. It finally arrived at the liver, through the hepatic artery, reduced both in amount and in concentration. The constant finding in such animals that the glycogen content of the liver was exceptionally high, led these two workers to state that a lessening of the normal insulin supply to the liver must be associated with an increased glycogen-fixing power.

Clinicians must therefore consider whether they are acting rationally in their glucose-insulin therapy. They are thrown back necessarily on animal experiments, for clinically the question is obviously difficult to settle. Elert, on the basis of animal experiments, decided that insulin did assist the storage of glycogen. Brentano is emphatic that the effect of it is entirely opposite. Walther has therefore put forward a series of experiments, which he started in 1939, to try to satisfy himself on the matter, for, as he states, in Germany today there is no insulin to waste.

In his first series of experiments small pieces of liver edge were removed under standard conditions from a number of rats. There were four groups of rats. In the first the section was taken after twenty-four hours' starvation; in the second, after forty-eight hours' starvation. In the third group, after forty-eight hours' starvation, two doses of three grammes of glucose were given by mouth; and in the fourth group the same procedure was adopted as in the third, with the addition of 0·2 unit of insulin with each dose of glucose. Quantitative analysis of the sections of liver removed from animals in the four groups showed the following respective average content of glycogen in grammes per 100 grammes of liver: group 1, 2·0 grammes; group 2, 0·07 gramme; group 3, 0·6 gramme; group 4, 0·12. In every case the longer fast brought the glycogen content sharply down, and in every case it was partially, but not wholly, restored by the addition of the glucose. Also in every case in which insulin was added to the glucose the degree of restoration was less than in those receiving glucose alone.

The second series of experiments was conducted on puppies, and was similar in nature. After forty-eight hours' fasting, sections of liver were removed, the animals having received five grammes of glucose per kilogram of body weight, and in an alternative series one unit of insulin was added to each four grammes of glucose. The results in this series were conflicting. When the glucose was given in two doses at nineteen and sixteen hours respectively before section, the series with glucose-insulin showed a higher average glycogen content (the two figures being 1·15 grammes *per centum* with glucose alone, and 1·58 when insulin was added). When, however, the interval between the glucose feeding and the section was reduced to five and two hours, the average glycogen content with glucose alone was higher (3·6 grammes) than when the insulin was added (2·68 grammes).

For further clarification of this point a third series of experiments on puppies was undertaken. Individual differences in the glycogen content of the liver between different animals are so great as to be important in a small series; and Brentano suggested that a truer estimate would be achieved by taking successive sections from the same animal in two operations, one after glucose-insulin and the other after glucose alone. Walther carried this out in twelve dogs, the interval between the operations being three to four weeks. In six of these animals the figures were in favour of glucose-insulin, and the other six showed higher glycogen values after glucose alone. There is, however, in this series an evident possibility that an external factor—namely, operative or post-operative liver damage—might influence results in the second section. Walther therefore performed a third operation on five dogs, arranging the administrations in the order: glucose-insulin, glucose alone, glucose-insulin. The results strongly support the idea that operative liver damage is an active factor, and that it can and does outweigh any benefit that the administration of either glucose alone or glucose-insulin can bring about. This is shown in the accompanying table.

Dog Number.	First Operation: Glucose-Insulin.	Second Operation: Glucose Alone.	Third Operation: Glucose-Insulin.
	Grammes *per centum*.	Grammes *per centum*.	Grammes *per centum*.
Dog 13	2·65	2·42	1·58
Dog 14	6·65	4·41	3·95
Dog 15	4·32	3·71	2·70
Dog 16	6·25	5·13	1·67
Dog 17	2·94	3·07	0·53

There is found no support in this whole series of experiments for the theory that small doses of insulin assist in building up glycogen reserves in the liver. On the contrary, they would seem to reduce them. The danger of transferring conclusions from animal experiments to the clinical field is admitted; but Walther submits that the administration of insulin clinically, in the hope of increasing glycogen storage, rests on very slender experimental foundations.

ARTHUR E. BROWN.

THE IMMEDIATE TREATMENT OF CLUB-FOOT.

H. Matheis (Graz): "*Die Sofortbehandlung des angeborenes Klumpfusses*", *Zeitschrift für Orthopädie*, Volume lxxiv, 1943.

THE first part of Matheis's article is concerned with the need for instituting "immediate" rather than "early" treatment of club-foot. Then after having discussed at some length the morphology of the foot, he proceeds to describe his own method of treatment. It aims not only at improving results, but also at shortening the period during which treatment is necessary. Any method of treatment which requires after-treatment to be carried on into the second year of the child's life throws an unnecessary burden on the mother. And those methods depending on a long series of night splints and bandages are of questionable practical value.

Infantile club-foot is very malleable, and by means of finger pressure correctly applied at the right spot any deformity can be corrected in a few properly spaced sittings. On the other hand, the effect of growth and movement on the club-foot of the newly born baby is an early worsening of the condition which is visible to observation. The principle of Matheis's method is therefore the use of bandages or appliances which can bring these forces of growth and movement into line with requirements and make them help rather than hinder recovery. Treatment must be instituted within twenty-four hours of the baby's birth; and it is pointed out that the skin of a newborn baby will tolerate plaster very well, though it may well be damaged by chemical antiseptics. There is more danger to the skin from chemical solutions used to cleanse it than from any properly applied plaster or good mastic solution.

The primary factor in the deformity is a strong inward rotation of the foot, a supination of the bearing arch. The first aim of treatment is to correct this, and no one who has once become accustomed to commencing such treatment on the first day of the baby's life will have any doubt as to the wisdom of it.

Treatment itself falls into two parts. First comes the elimination of the supination of the sole. Once this is efficiently achieved and a position of pronation exists, those same forces of growth and movement, the factors of muscle pull which cause such swift deterioration of the uncorrected position, will now act in the opposite and favourable sense. The desired position of pronation can in many cases be achieved by firm and skilful finger pressure in a single session. A light wooden splint and plaster appliance, when properly applied, will suffice to maintain the position. Pads of soft rubber exercise spring pressure. The sole is kept from crumpling by being affixed to a shaped sole piece of stiff cardboard. The correct placing of pads and plaster bands is important if skin damage is to be avoided. After each application of this appliance it is left for a few days and then replaced by one in somewhat fuller correction. Full over-correction should be reached after three or four changes; and the second stage of the treatment commences.

The second stage consists of the application of a well padded plaster splint reaching from half-way up the thigh to the toes; the knee is well flexed, and the foot is firmly dorsiflexed and moulded into full over-correction by the fingers during the setting of the plaster. The plaster, as soon as it is hard enough, is split from knee to toes right through to the skin. The effect of this is that any room required by the fore part of the foot for growth or movement is taken laterally, whereby the effect of growth and movement is to promote pronation. In fact, special warning is given that if the splint is left in place unchanged for more than three weeks, natural growth may well have been found to bring about an undue degree of pronation and flattening of the sole.

After two or at most three weeks the thigh part of the splint is removed, and the following week is devoted to extension of the knee and stretching of the calf muscles. The plaster is replaced in an improved position and the same sequence is carried out. The procedure is repeated as needed; but the full effect of the treatment is generally reached by the fourth month of the child's life.

Plaster treatment can be discontinued when the foot naturally retains its over-corrected position and cannot easily be pulled back into the faulty one. When it is evident that the peroneal muscles have regained their full tone and function, the danger of relapse is past and further treatment is unnecessary. The child should be kept under observation for a month, and if the position then remains good, no further after-treatment is required.

ARTHUR E. BROWN.

Reviews.

Penicillin in Warfare. Special issue of *The British Journal of Surgery.* By many authors; 1944. Bristol: John Wright and Sons, Limited. 10¼″ × 7½″, pp. 224, with 128 illustrations. Price: 12s. 6d. net.

PENICILLIN is in the process of revolutionizing war surgery. Not only are soldiers recovering from wounds more rapidly, but surgery, previously thought impossible, may now be performed with safety.

In the special issue of *The British Journal of Surgery*, "Penicillin in Warfare", an account is given of the use of penicillin in battle casualties and some of these revolutionary changes are discussed and illustrated with case reports.

The issue commences with introductory articles on "The Principles of Penicillin Treatment" and "Bacterial Methods in Connexion with Penicillin Treatment". The former summarizes the properties and methods of use of penicillin, and should be read by all who are interested in the use of penicillin in no matter what type of case. Few failures in treatment will be encountered if the principles as laid down by the authors are followed. The latter deals concisely with laboratory methods for determining the sensitivity of organisms and for assaying the quantity of penicillin in solutions or in body fluids.

There follows a series of special articles in which the use of penicillin is discussed in many varieties of war wounds. The authors, Army and Air Force surgeons and specialists, many renowned in their own sphere, have contributed articles on such subjects as the bacteriology of war wounds, the use of penicillin in soft tissue wounds and compound fractures, gas gangrene infections, wounds of the chest, head and spinal wounds, and penicillin treatment in venereal diseases.

The conclusions reached by the authors as to the efficacy of penicillin vary according to the type of wound being treated. Some are enthusiastic, some guarded, and one states that the results are no better than a comparable series treated without penicillin; but all are agreed that by whatever means and in whatever amounts penicillin is used "there is an overbearing need for meticulously careful and aseptic surgery". Despite this unanimity, descriptions of actual surgical technique are not given, nor is a uniform terminology used. The reader wonders whether the "debridement" of one surgeon corresponds to the "excision" of another or the "trimming" of a third.

The issue is well illustrated in numerous articles and the discussions are frank.

The Medical Annual. Edited by SIR HENRY TIDY, K.B.E., and A. RENDLE SHORT, M.D., F.R.C.S.; 1944. Bristol: John Wright and Sons, Limited. 8½″ × 5½″, pp. 404, with 44 illustrations. Price: 25s. net.

THIS book appears in its usual yearly form, and is just as much to be recommended as ever.

Of special interest to surgeons are reviews of the year's literature on methods of operation for the cure of inguinal hernia. Brigadier Harold Edwards considers that the usual place for recurrence in military-age patients is at the internal ring. In his opinion most of the poor results have followed the Bassini operation. He states that at first he was well pleased with the floss silk repair operation, but later experience showed that sepsis was unpleasantly frequent. He mentions also the use of osteo-periosteal grafts from the tibia to close the gap in repairing direct inguinal hernia.

Mention is made in the section on intervertebral disks that rupture of the intervertebral disk has been diagnosed more and more by clinical means and less and less by X-ray contrast media, the use of which it is considered will in the end disappear. In the section on blood transfusion, full mention is made of the Rhesus factor, in which it is mentioned that Rhesus-negative persons should be transfused with Rhesus-negative blood, and that mothers of infants who have *erythroblastosis neonatorum* should not be transfused with blood, unless Rhesus-negative blood of the appropriate group is available, and the infant should be given group O Rhesus-negative blood if possible. In the section on carcinoma of the breast, it is recorded that Adair, of the Memorial Hospital, New York, had 51% of 1,383 patients alive at the end of five years. Of patients with no axillary involvement, 76·8% were alive at the end of five years. He concluded from a study of 3,525 cases that radical amputation combined with post-operative irradiation is the method of choice. Stannard, of New York, discusses œdema following mastectomy for carcinoma, and considers this to be due to lymphatic obstruction; he advises the use of light artery forceps and thin ligature material in order to prevent these untoward effects. He suggests as treatment anastomosis of

the enlarged upper arm to the chest wall. He shows pictures in which the œdema has disappeared, and though, of course, after this procedure, the patients cannot abduct the arm, it is possible for them to touch their chin.

In the section on burns of this war, Wakeley remarks that though there is a tendency amongst surgeons to eliminate tannic acid entirely in the Navy, coagulins such as triple dye are still used extensively as a first aid measure. As usual in this and the last war, the two most important factors are the early elimination of sepsis and the early skin grafting of deep burns. He states that there can be no doubt whatever that penicillin is more active than the sulphonamides in eliminating streptococci and staphylococci from burns. Bodenham used a penicillin cream base with great success in a Royal Air Force burn centre. Immediate skin graft in the treatment of burns has been demonstrated by Young with excellent results.

In the treatment of carcinoma of the prostate, castration or castration *plus* diethylstilbœstrol, first suggested by Huggins in 1941, has been substantiated by a number of papers. The relief is dramatic, though temporary. It is suggested that the occasional good results that follow deep X-ray therapy in cases of prostatic carcinoma are due to accidental irradiation of the testes. The acid phosphatase level is greatly raised in the blood when a carcinoma of the prostate is present, particularly with metastases. This is a good test for the progress of the disease.

The Surgery of Abdominal Trauma. By GEOFFREY E. PARKER, M.B., B.Ch., F.R.C.S.; 1944. London: J. and A. Churchill, Limited. 8″ × 5″, pp. 128, with 10 illustrations. Price: 10s. 6d.

THIS is a short monograph on abdominal surgery, written by a surgeon who saw service in North Africa and Italy, and consists mainly of the complete records of ninety-four cases of abdominal and abdomino-thoracic wounds, in all of which operation had been performed by the author. He quotes from his figures to show the importance of early operation. The recovery rate in twenty-one cases in which operation was performed within six hours of wounding was 84%. Among nineteen patients seen after twenty-four hours there was a recovery rate of only 33%. Anæsthesia was in all cases maintained with an ether vaporizer and an intratracheal tube. Wounds of the colon were exteriorized as far as possible. Sulphanilamide powder and emulsion of sulphadiazine were used both for retroperitoneal and intraperitoneal use. In one case in which the patient died from other causes following suture of eight ileal perforations, sulphadiazine emulsion was still present along the suture lines and no infection was found. The author advises a routine mid-line incision five to eight inches long, which may be elongated easily to an L-shape in either direction. He also considers that jejunal are more fatal than ileal perforations because of the more irritating and digesting nature of the contents of this part of the bowel. Death occurred after injuries to the colon in fifteen out of thirty-two cases. The author draws attention to the ease with which a subperitoneal injury of the rectum may be overlooked, and states that examination and proctoscopy should be done in all cases of buttock wounds. In discussing pre-operative and post-operative treatment, he stresses the choice of the exact time for operation, and the use of either continuous or intermittent post-operative stomach aspiration through a Ryle, a Miller-Abbott or other form of tube.

This little book, though a bit difficult to read because of its arrangement, is in line with present-day medical practice in the treatment of abdominal wounds.

Shoulder Lesions. By H. F. MOSELEY, D.M.; 1945. Springfield, Illinois: Charles C. Thomas. London: Baillière, Tindall and Cox. 10″ × 6¼″, pp. 192, with 70 figures. Price: $4.50.

THIS is a clear, diagrammatic and dogmatic treatise on lesions of the shoulder joint. Beautiful photographs are a feature of the book, which is splendidly produced in a most readable manner, being in format not unlike one of the leading American weekly magazines.

The first section of the book describes the mechanism of the shoulder joint. To illustrate this photographs are shown of the range of movements obtainable when there is ankylosis, firstly of the shoulder joint and then of the sterno-clavicular joint. Muscle function is shown by a series of photographs of the movements present when particular muscles have been paralysed.

A section deals with calcification in the "rotator cuff". This was more frequent in the supraspinatus than in the subscapularis muscle tendon. F. L. McNaughton devotes a chapter to neurological aspects of shoulder pain, and J. Bouchard and C. B. Peirce a chapter on X-ray diagnosis and treatment. Operative procedures and physiotherapy

receive attention, and the final paragraph of the book is taken up with a series of detailed case histories.

This is a clear, graphic and useful book. The text and illustrations are so clear and direct that, right or wrong, they carry to the least observant reader.

Fractures and Fracture Treatment in Practice. By KURT COLSEN, M.D.; Second Edition; 1944. Johannesburg: Witwatersrand University Press. 8½″ × 5¼″, pp. 156, with 163 illustrations. Price: 12s. 6d.

IN 150 pages the author has covered concisely the present position of fracture treatment so that the overburdened student or general practitioner may gain a good working knowledge of fracture management. There is a need for this type of book particularly among senior students, who otherwise would get lost in the wealth of detail provided by Böhler or Watson-Jones.

The use of simple clear diagrams rather than poorly reproduced X-ray photographs is commendable and obviates the need for detailed explanations.

The book is subdivided into two parts. Part one deals with general considerations of types of fractures, principles of treatment and so on. Part two covers the treatment of individual fractures. Without increasing the number of pages it should be possible to devote more detail to such important and disabling fractures as Colles's fracture and less to a highly specialized treatment, that of fracture of neck of femur. Further, the stressing of the use of local, rather than general, anæsthesia for closed and even for open fractures is debatable in a book for students. Elastic traction on the fingers as a valuable treatment of late Volkmann's contracture could have been recommended.

With these reservations the book is to be recommended because of its brevity and clarity.

The Pathogenesis of Tuberculosis. By ARNOLD R. RICH, M.D.; 1944. Springfield, Illinois: Charles C. Thomas. London: Baillière, Tindall and Cox. 9¾″ × 6″, pp. 1032, with 89 illustrations. Price: $10.50.

THIS book presents in a masterly manner the known facts and principal theories relating to the pathogenesis of a disease which in many parts of the world is still the commonest cause of death between the ages of fifteen and forty-five years. Its purpose, in the words of the author, is "to present the background for the interpretation of the pathogenesis of the disease, i.e. the factors that determine the character of the lesions and the progress or arrest of the infection, and the principles that govern the action of those factors". Professor Rich has succeeded admirably in this purpose. He has carried out his task with clarity and objectivity. The subject is dealt with in great detail, but a fine balance is preserved and the reader's interest never flags.

This book embodies the result of over twenty years of research by the author and his colleagues at the Johns Hopkins School. A bibliography of more than 1,400 references is an indication of the vast amount of international literature surveyed. In spite of wartime conditions, the publication is worthy of the high standards associated with the name of Charles C. Thomas.

The book begins with an exposition of our present knowledge of the action of the different chemical constituents of the tubercle bacillus. Then follows a survey of the facts known about the various types of tubercle bacilli. Variations in morphology and virulence are discussed in detail. *In vivo* increase in virulence of the attenuated "B.C.G." strain is regarded as improbable.

The subject of native resistance in its relation to species, race, heredity and the individual, with the attendant influences of sex and age, is covered in great detail.

The phenomenon of hypersensitivity, on which Professor Rich has spent years of research, is also surveyed at length. There is now definite evidence that acquired resistance is not dependent on hypersensitivity. When dealing with acquired resistance, the author discusses the intimate role of the antibodies, phagocytes and lymphoid cells as well as the other factors influencing its development and maintenance. Lesions and symptoms are studied from the point of view of the determining circumstances. One important fact from the point of view of chemotherapy is that tubercles and caseous lesions, if not markedly encapsulated by fibrous tissue, are permeable to diffusible substances which do not combine with protein in the body. The author is hopeful of the possibilities of chemotherapy. As he points out, we are at present unaware of the relative frequency of either exogenous or endogenous reinfection in the adult type of pulmonary tuberculosis. Prevention, therefore, obviously demands both protection against the infective agent and an improvement in environmental conditions.

The final chapter deals with the decline in mortality from tuberculosis. Decrease in virulence and natural selection are both rejected as causes. Environmental factors, especially improved living and working conditions, offer the best explanation. Other

influences are the anti-tuberculosis campaign, improved diagnosis and treatment, decrease in opportunities for contact infection, decline of the birth rate and a change in the age composition of the population. The view that in twenty years the disease in some countries may be virtually eliminated does not, according to the author, take sufficient account of the prevalence of "subclinical" or "carrier" infection.

This is the most important book at present available on the pathogenesis of tuberculosis, and should be read by all interested in this subject.

Notes and Comments.

FOREIGN BODIES IN THE RECTUM.

A.C., AGED twenty-five years, an enterprising and practical young man, suffered for some years with hæmorrhoids, which he is quite sure were caused by the saddle of the bicycle he rode in long-distance races.

Noticing one morning that he passed some bright blood after defæcation, he was quite upset because he believed the blood from piles was always dark. Thinking something else was the matter, he decided to investigate. He firstly investigated the matter by passing a finger into the anus. However, the finger examination done on himself proving "negative", the patient decided that even though he could feel nothing, he might be able to see something. He therefore perched himself sitting on the edge of a chair and placed a mirror on the floor. As the appearance of the anus satisfied his judgement of normality, he thought he should go further and inspect the interior of his rectum. Looking for some object that would serve the purpose of a speculum, he hit upon the household medicine measure. He then attempted to pass this base first through the anal canal, and succeeded only too well, for it passed into the rectum and could not be passed out again. He was now in trouble, for he appreciated the fact that the shape of the object, with its broad end lowermost, would prove an insuperable obstacle to its passing through the canal. Thinking the matter over, he decided to alter the shape of the base so that it would pass, and with this in mind he passed into the anus a "bobs" ball (a wooden ball about the size of a golf ball—1·62 inches in diameter). This went into the glass measure, but did not project sufficiently far to alter appreciably the shape of the base.

Finding that he could not expel the object without unusual assistance, he decided that, as the *vis a tergo* was not equal to the task, he might help with some *vis a fronte*. To apply this he created by heat a partial vacuum in a pickle bottle, and applied this over the anus. However, it proved unavailing, and at this stage he sought medical attention.

I saw him in the evening of the eventful day and decided that the first step was to produce a paralysis of the external sphincter, and this was effectively produced by a low spinal anæsthesia. With the sphincter widely dilated fingers were passed in and an attempt made to rotate the glass, but as the mucosa of the rectum had swelled as the result of the treatment it had received, this was not possible owing to lack of room. An attempt was made to obtain a hold of the glass with a large pair of stone forceps, but again, owing to the swelling, the whole of the glass could not be exposed at one time. Eventually a couple of small retractors were passed behind it and were kept sufficiently in place by the swollen mucosa to enable a grip to be got on the object, which was then easily withdrawn.

The noteworthy part of this recital is the accuracy of the methods used by the patient, which failed because the tools were inefficient, and again the cheerful foolhardiness with which he ignorantly tampered with a machine of whose structure and function he had only the haziest ideas.

Melbourne. LEO DOYLE.

NOTE ON RECENT DEVELOPMENTS IN THE TREATMENT OF CARCINOMA OF THE PROSTATE.

THE work of Huggins[1] and others in recent years has proved that the epithelial cells of carcinoma of the prostate are responsive to depression of the androgen hormone level in the body. This can be brought about either by castration or the administration of œstrogen, usually in the form of diethyl-stilbœstrol or diethyl-stilbœstrol dipropionate. There is no claim to complete cure, but much evidence to support the assertion that in a large proportion of cases there is a regression of the condition or at least a slowing up of the progress of the disease.

A remarkable improvement in clinical symptoms of pain and appetite and weight loss can be produced in cases of metastasizing carcinoma. Frequently also it is possible

to produce regression in metastases in bones, lung and glands, and locally the primary growth in the prostate may become softer and smaller, and thus less obstructive to urination. The microscopic appearance[2] of carcinomatous prostatic tissue shows evidence of the effect of the administration of stilbœstrol by degenerative changes in many of the malignant cells. In prostatic carcinoma with metastases the serum acid phosphatase is usually increased, often greatly, but is not increased if the carcinoma has not metastasized.

The clinical application of these data brings up the following considerations:

1. Whether castration is necessary or not in view of the effect of œstrogen administration.

2. The method[3] of performing castration. Subcapsular removal of the gland through a single small scrotal incision causes a minimum of trauma and retains a practically normal appearance.

3. The method of administration of diethyl-stilbœstrol. The routine dosage personally adopted is ten milligrammes intramuscularly for seven to ten days, followed by a permanent maintenance dose of three milligrammes daily by mouth. If the response in clinical condition or reduction of acid phosphatase level in the blood is insufficient, further injection courses can be administered.

Other reports of the use of more massive doses over long periods without harmful effects have appeared. Sometimes toxic effects of the administration of stilbœstrol are complained of (for example, nausea or irritation in the breast), necessitating a temporary reduction in dose. The guide to a sufficient dose of stilbœstrol is given by a combination of clinical results, the amount of acid phosphatase in the blood, and the production of toxic effects.

4. The plan of management of carcinoma of the prostate with obstruction and retention of urine is: (i) Indwelling catheter dreinage. (ii) Injection of stilbœstrol, ten milligrammes, intramuscularly for seven to ten days. Occasionally it may be advisable to perform castration as well. (iii) If the patient is still unable to void well, transurethral resection is performed, or perineal excision in selected cases. (iv) In either case a maintenance dose of stilbœstrol, three milligrammes a day, is given.

Adelaide. IVAN B. JOSE.

References.

[1] C. Huggins, W. W. Scott and C. V. Hodges: "Studies on Prostatic Cancer. III. The Effects of Fever, of Desoxycorticosterone and of Estrogen on Clinical Patients with Metastatic Carcinoma of the Prostate", *The Journal of Urology*, Volume xlvi, 1941, page 997.

[2] P. J. Kahle, J. R. Schenken and E. L. Burns: "Clinical and Pathological Effects of Diethylstilbestrol and Diethylstilbestrol Dipropionate on Carcinoma of the Prostate Gland", *The Journal of Urology*, Volume xlviii, 1943, page 99.

[3] R. Chute, A. R. Willetts and J. P. Gens: "Experiences in the Treatment of Carcinoma of the Prostate with Stilbestrol and with Castration by the Technique of Intra-Capsular Orchidectomy", *The Journal of Urology*, Volume xlviii, 1942, page 682.

Proceedings of the Royal Australasian College of Surgeons.

ANNUAL GENERAL MEETING.

THE eighteenth annual general meeting of the Royal Australasian College of Surgeons was held at Melbourne from Saturday, May 12, until Tuesday, May 15, 1945.

INAUGURAL MEETING.

The inaugural meeting was held in the Wilson Hall of the University of Melbourne on Saturday, May 12, 1945.

Address by Surgeon-Captain Lambert Rogers, R.N.V.R.

Surgeon-Captain Lambert Rogers, R.N.V.R., a member of the Council of the Royal College of Surgeons of England, delivered the following address:

The hazards of war are such that those of us in the Services never know from day to day where we may next find ourselves; but I regard it as a particularly happy one which both brings me back to my birthplace and gives me the opportunity to be present

at this meeting. Not only does it give me great pleasure to be present here this evening, but I welcome the opportunity to do three things. First, as a member of the Royal Navy, to thank you, Sir Alan Newton, and the Fellows of the Royal Australasian College of Surgeons, and through you the medical profession in Australia, for all your kindness to those of us who are out here with the Fleet. As an Australian, I had no doubt of the warmth of the welcome we should be given; but we shall never forget the many acts of kindness, the courtesy and the generous help which we have received everywhere in Australia. Secondly, Mr. President, it gives me the opportunity, as a member of the Council of the Royal College of Surgeons of England, to convey to you and your Council the good wishes of the President and Council of the English College. Here may I say what a delight it is to me to see the beautiful buildings of your sister College and to note how gracefully she has developed. Although the elder sister in London is both shabby and disfigured as a result of the war, it is good to find the younger looking so fresh and blooming: "Leah was tender eyed, but Rachel was beautiful and well favoured."

In this connexion I should like to thank you for your staunch support and encouragement in our efforts not only to restore but, shall I say, rehabilitate (oh! magic word) the elder sister. Only last week I had a letter from my President, Sir Alfred Webb-Johnson, who wrote:

> I am delighted to hear that you are going to attend the annual meeting of the R.A.C.S. I would like you to give my personal affectionate greetings to the Fellows of the College, and tell them that I have always happy memories of when I was able to visit them. All members of the Council also wish you to convey their greetings, and particularly to thank the Australasian College for their support and encouragement in our efforts to restore the College once more to its proud position and to make such developments as will make it not only worthy of its great traditions, but worthy also of our generation and the great duties that lie ahead. We hope that surgeons from all over the Empire will feel that it is their home when they visit London. Our plans include a large hall and common rooms so that surgeons can make it their social as well as their spiritual home.

The piece of ground on which the Royal Australasian College of Surgeons stands is dear to me because, thirty years ago, I was a pupil at the high school which preceded it on that site. The old school has moved elsewhere, but it is good to find that from its ashes has arisen this great College in which one has the honour to be a Fellow and to remain a student. One is reminded of Plato's saying that education is a life-long process.

Finally, if I may say a word as to the future, I would venture to predict a great one for this young and blooming College. It will have many functions, the chief of which, however, must always be the maintenance of the highest standards of surgery and the pursuit of truth whose form divine, as Sir William Osler reminds us, we may see in those moments when mortality weighs less heavily upon us.

Not least among the functions of this College, however, will be that of linkage with the elder sister in England. From time to time, we in England have sent out examiners so that candidates in Australia might sit here for the first part of the examination for the Fellowship of the English College, a diploma which has now been established for over a century, and I think you will agree with me is regarded as a hall-mark among qualifications in surgery. In the future, however, is it too much to hope that the traffic in examiners may not all be one way, but that we may have Australian examiners coming to England to help conduct the examinations there? If the Courts of Examiners of our two colleges could thus associate, the examination for the Fellowship of each would, I believe with mutual advantage, be made a uniform one. I do not propose to elaborate this theme further this evening, except to say that post-war aerial travel may make this less difficult than it might now appear, and that this closer association of our colleges would not only do much to broaden surgical outlook, but also to strengthen the ties of Empire which link us surgeons together.

I thank you for giving me this opportunity to address you. It gives me very great pleasure to convey to you the heartiest and best wishes of my President and Fellow Members of the Council of the Royal College of Surgeons of England.

President's Address.

The President, Sir Alan Newton, delivered the following address:

On behalf of my College, I must first thank Surgeon-Captain Lambert Rogers for his eloquent address. We welcome him and his brother officers of the Royal Navy not only for their own sakes but also because, like our kinsfolk in England, we know that the Navy is the greatest defence and ornament of the Empire—its "ancient and natural strength". We cannot do too much to help and to honour it.

We welcome Surgeon-Captain Lambert Rogers in addition as a member of the Council of the Royal College of Surgeons of England, and we are most grateful for the message of good wishes he has brought us from it. We shall never forget that, from the day our College was founded, our progress has been encouraged and supported in

every possible way by our elder sister in England. And now he tells us that she stands "shabby and rather disfigured as a result of the war"—a characteristically British understatement of the fact that her buildings have been shattered by enemy bombs—but that, like Leah, she is tender eyed because, like Rachel, we are beautiful and well favoured. This profoundly moving remark brings two thoughts to our minds. The first is that the quotation might well have been taken from the New instead of the Old Testament because, in England, Rachel is weeping for many of her very little children. The second is that we civilians in Australia who have suffered so little, must spring to the aid of those in England who have endured so much so valiantly. I am glad, therefore, to be able to tell you that a cable has been sent from my College to Sir Alfred Webb-Johnson, President of the Royal College of Surgeons of England—who, by the way, gave the last Syme Oration delivered in this hall—informing him that Australian surgeons will send at least £1,000 to his rebuilding fund and that New Zealand surgeons are taking similar action. I have received this cable from Sir Alfred in reply: "I am extremely gratified by your message. The support of your College will be a great inspiration to me and my colleagues and will forge another bond between us."

It is usual for the President, on occasions such as this, to refer to some aspect or other of College activities. Today it is eighteen years old, and, as it bears the title "Royal", it may claim to have come of age. It seems appropriate, therefore, to describe briefly the way in which it has been directed in its infancy in order to equip it to fulfil its adult duties.

May I explain to those of you who come in contact with the College only upon ceremonial occasions such as this that it was not founded primarily to give its President an opportunity of addressing you in a gown adorned by enough gold braid to complete the rings on the sleeves of all the medical officers in the Navy—rings which have been reduced to semicircles by the exigencies of war. This robe and this ritual are simply the outward signs of an inward devotion to an ancient and honourable surgical tradition which enjoins that surgeons must do everything in their power to teach their successors and to extend their own knowledge of the science and art of surgery. You will agree that it is very much in the public interest that this work should be well done, and I hope that you will also agree that, as surgeons know what is required of a surgeon, they are the most suitable people to direct it. In order to do so, they founded this College. Let me tell you now how they developed it.

The College building stands in this city and is, I believe, an ornament to it. This building houses the administrative headquarters of the College, its lecture hall and, last but not least, its library. We are proud of this library, which contains a most valuable collection of old surgical books in addition to all recent books and journals of surgery and allied subjects. It has done good war service by supplying, free of charge, reprints, translations and photostats of articles to many medical officers of our own forces and those of our Allies. The College publishes a journal of surgery, now in its sixteenth year, which has contained some notable contributions to surgical knowledge. It has established and raised the standard of its entrance examination until, today, it has reached a level comparable to that of similar examinations overseas. I make no apology for informing you of this fact because, whatever may be the case in other walks in life, the qualities which enable a candidate to surmount the trials and tribulations of a difficult examination are the very qualities which are essential for success in surgical life—a statement which can be readily confirmed by a reference to past examination results in any faculty of medicine.

But the mention of these developments serves merely to point the obvious because all colleges of surgeons do these things. My College has gone further. It has not been content merely to hold examinations, but has entered the field of education by providing facilities for, and supervising the training of, all candidates for its Fellowship. It insists that, in addition to a term as a house surgeon, these men must undergo a further period of "apprenticeship" training under the direction of a senior surgeon. It is not enough for a surgeon to know what is in his books; he must know also what is in the body. In pursuance of this aim the College has entered into an agreement with Prince Henry's Hospital in Melbourne whereby this institution becomes a post-graduate training school in surgery and, further, has made arrangements with the majority of large hospitals in Australia to make available positions of a type suitable for this apprenticeship training. This constitutes an important and significant advance in surgical training.

It will occur to you at once that a long and difficult training of this description, however desirable in the public interest, may be beyond the means of many suitable candidates. To meet this difficulty a large part of the funds of the College has been set aside to provide bursaries for able young men who wish to qualify for its Fellowship. The income from the funds thus set aside has accumulated during the war and will be applied at the discretion of the Council to meet the post-war needs of suitable men now on service.

I do not wish you to infer that the College has been developed solely to educate young surgeons. By organizing meetings such as this, it brings all its Fellows together

for scientific discussions and operative demonstrations, with the result, already evident, that the general standard of surgical work is being continuously improved

These educational activities serve to maintain standards at an approved specialist level; but, in order to raise this level, it is essential to foster the scientific progress of medicine and surgery. Aware of this fact, the College has made grants for research work, but it is hampered in its desire to encourage this work by the notorious fact that adequate facilities for it are lacking in this country. It is beyond the power of the College alone to erase this blot upon the name of Australia. Unhappily, the blot is clearly visible from overseas—a fact which explains the difficulty we experience in replacing our own able men who have accepted research positions abroad by men of equivalent ability from other countries.

You will have noticed that I have mentioned research grants and bursaries and may wonder how the College has obtained enough money to provide these. Its assets, at present values, amount to approximately £130,000, excluding the value of its building, which was erected free of debt. Every penny of this sum has been given in various ways by surgeons themselves during the past eighteen years—a time when surgical fees, as measured by money values, have steadily decreased. I do not make this statement in any spirit of boastfulness—I assure you that surgeons have no desire to establish a monopoly in this field of benevolence—but I do think that, in justice to them, I should point out that they have not given this money for any selfish purpose. They have given it in a laudable and altruistic desire to improve the surgical service available to the people, by endowing a body which will teach their successors to do even better work than they have done themselves.

So far I have referred to the work of the College in promoting surgical education and research, but please do not imagine that it has been unmindful of the fact that this forms only a part of the wider problem of medical education in general and that cooperation is necessary between all the bodies concerned with the various aspects of this problem. For example, the College is vitally interested in, and must support to the uttermost, the efforts of the universities to maintain the quality of medical students. I hesitate to refer to a surgeon as a silk purse, but you certainly cannot make a good one out of a sow's ear. It must cooperate with those post-graduate committees which have done such good work in the general field of post-graduate education. Above all, it must join forces with its sister College of Physicians. A sound basis for future cooperation of this sort has been laid by the College during its infant development under the belief that all the various bodies concerned with medical education must go forward hand in hand, and thus weld together the various aspects of medical education and research into a coherent whole worthy of the prestige of our profession.

Nor must this cooperation be confined within the limits of this country. From the outset, my College has developed a close relationship with the Royal College of Surgeons of England. It was at our request that the Primary Fellowship examination of the English College was held in this country at regular intervals before the war. The cost was shared equally by the two colleges. We have encouraged our young men to go to Britain. They have never been reluctant to do so, as witness the fact that more than two hundred of our Fellows are also Fellows of the Royal College of Surgeons of England and an additional one hundred and fifty are Fellows of the Royal College of Surgeons of Edinburgh. We are most anxious to strengthen these and other links with the senior colleges, but, at the same time, we must develop our own examination system. It follows that we welcome with enthusiasm Surgeon-Captain Lambert Rogers's statesman-like suggestion that a system might be devised whereby the Courts of Examiners of the two colleges might combine to bring about a uniformity of standard of the two examinations. I agree cordially that such a development would have a profound imperial significance. We shall do everything in our power in this and other ways to promote a constant interchange of surgeons between the Mother Country and the Dominions.

I must end this brief address with an apology. My profession, like the Navy, is traditionally a silent service. In this somewhat blatant account of what we have done to develop our College I have forsaken this tradition. I take some comfort from the fact that even the Navy is less silent today than hitherto about its achievements. After all, in these days, when catch phrases like "planning" and "new orders" are on everybody's lips, it may not be quite unforgivable to point out that, eighteen years ago, surgeons of my generation made plans for a new order in surgery and, what is more, that they have brought their plans to fruition. They have done this by devoting their time, their energy and their money to the service of the community by creating this College and equipping it to advance the knowledge and practice of surgery. But even a passing glance at those of us who are on this platform will suffice to prove that we are no longer in the first flush of youth. It will soon be the turn of the next generation of surgeons to uphold the faith and carry on the work. I trust and believe that they will do this with zeal and devotion equal to that which they are displaying today in the service of our King and our Empire.

George Adlington Syme Oration.

The ninth George Adlington Syme Oration was delivered by J. D. G. Medley, Esquire, M.A. (Oxon), Vice-Chancellor of the University of Melbourne, entitled "The University and the Medical Profession".

Ceremony of Formal Admission of New Fellows.

The following were formally admitted to Fellowship of the College:

In General Surgery: Murray Alexander Falconer (New Zealand); Hugh Collis Barry, Alexander Skeffington Johnson, Raymond Victor Rickard (New South Wales); Derick McRae Yeates, James Macrae Yeates (Queensland); Hamilton D'Arcy Sutherland (South Australia); James Grayton Brown, John Daniell Begg, Gerald Brosnan, Charles Washington Gale, John Charles Colahan Mullany, Kenneth Fitzpatrick Russell, Thomas Hamley Wilson (Victoria).

In Ophthalmology: Dudley Plunket Gurd (England), Arthur Wolseley D'Ombrain (New South Wales), Samuel Rudolph Gerstman (Victoria).

In Larygo-Otology: Denis Francis O'Brien (Victoria).

Presentation of the Ryan Scholarships in Surgery.

The President presented gold medals to George Stretton Gunter and Richard Kernan Newing, the winners of the J. P. Ryan and Michael Ryan Scholarships in Surgery.

COUNCIL MEETINGS.

Admission of New Fellows.

The following Fellows were admitted by the Council at a meeting held on Saturday, May 12, 1945:

General Surgery: Leicester Hammond Aitken (New Zealand), Hugh Collis Barry, Raymond Victor Rickard (New South Wales); Derick McRae Yeates, James Macrae Yeates (Queensland); Hamilton D'Arcy Sutherland (South Australia); John Daniell Begg, Gerald Brosnan, Charles Washington Gale, John Charles Colahan Mullany, Kenneth Fitzpatrick Russell, Thomas Hamley Wilson (Victoria).

Ophthalmology: Dudley Plunket Gurd (England); Arthur Wolseley D'Ombrain (New South Wales); Peter Bede English (Queensland); Samuel Rudolph Gerstman (Victoria).

Laryngo-Otology: Denis Francis O'Brien (Victoria).

The following matters arising out of the Council meeting held on Sunday, May 13, 1945, are published for the information of Fellows.

Election of Council.

Nine nominations were received to fill six vacancies on the Council. As the result of the ballot, the following Fellows were elected: Sir Alan Newton, Professor F. Gordon Bell, Professor H. R. Dew, Sir Hugh Devine, H. R. G. Poate, J. Bruce Hamilton.

Election of Office-Bearers.

The following appointments were made:

President: H. R. G. Poate.
Vice-Presidents: Professor F. Gordon Bell, T. E. Victor Hurley.
Censor-in-Chief: W. A. Hailes.
Honorary Treasurer: Balcombe Quick.

Appointment of State and Dominion Committees.

The following appointments were made:

New South Wales: A. J. Aspinall, V. M. Coppleson, B. T. Edye, T. M. Furber, J. W. S. Laidley, T. W. Lipscomb (deputy for A. M. McIntosh), I. Douglas Miller.

Queensland: J. C. Hemsley, A. E. Lee, J. J. Power, A. D. D. Pye, Neville G. Sutton, Derick M. Yeates.

South Australia: R. M. Glynn, H. Gilbert (deputy for L. A. Wilson), I. B. Jose, L. C. E. Lindon, P. S. Messent, B. H. Swift.

Tasmania: F. W. Fay, B. Hiller, H. W. Sweetnam (deputy for D. W. L. Parker).

Victoria: A. Fay Maclure, J. Newman Morris, Henry Searby, John H. Shaw, C. Gordon Shaw, G. R. A. Syme, B. T. Zwar.

Western Australia: F. J. Clark, H. B. Gill, D. D. Paton.

New Zealand: P. Stanley Foster, J. A. Jenkins, F. Macky, B. C. Rennie, J. Leslie Will, H. M. Wilson.

HYDATID REGISTRY.

THE following is the annual report of the Hydatid Registry of the Royal Australasian College of Surgeons for the year ending 31st March, 1945, submitted by the Registrar-in-Chief, Sir Louis Barnett.

The Hydatid Registry, instituted in the year 1930 on the suggestion of the writer, aimed at the collection and filing of 1,000 hydatid cases, recorded on specially printed forms containing two large diagram blanks.

In the early years a Hydatid Committee was set up consisting of Sir Hugh Acland, Mr. F. Gordon Bell and the writer; and a Registrar, Mr. R. A. H. Fulton, who received a small honorarium, was also appointed. In 1935 the Council of the Royal Australasian College of Surgeons modified the organization of the Registry by appointing the writer as Registrar-in-Chief and giving him sole directional control.

As indicated in the subjoined table the total of records now on file, 1802, is approaching the 2,000 mark, and it will be a gratification and a pride to the writer if that figure is achieved within his rapidly dwindling lifetime.

	Australian Cases.	New Zealand Cases.	Total.
Liver	537 } 606	478 } 534	1,140
Secondary peritoneal	69 }	56 }	
Lung	216	225	441
Muscles and fascia	36	46	82
Bone	13 } 29	11 } 17	46
Spine	16 }	6 }	
Kidney	15	24	39
Spleen	15	8	23
Brain	7	9	16
Heart	4	2	6
Thyreoid	0	2	2
Breast	1	2	3
Pancreas	1	1	2
Parotid	1	0	1
Prostate	0	1	1
Total	931	871	1,802

Grateful appreciation is extended to those members of hospital staffs, senior and junior, who have been good enough to send along their records.

Staff depletions and the hurry and scurry inevitable in wartime have interfered considerably with the quantity and quality of the records received. On the other hand, the routine X-ray examination of war recruits has brought in some additional lung records which otherwise might have been missed.

To assist in the collection of cases the following Local Registrars have at different times officiated: R. A. H. Fulton, of Dunedin; L. A. Bennett and D. M. Dickson, of Christchurch; D. White, of Wellington; J. Fitzsimons, of Auckland; H. R. Dew, of Sydney; G. R. A. Syme, Julian Smith, junior, and J. B. Turner, of Melbourne; J. B. Hamilton and T. Giblin, of Hobart; F. Clark and H. H. Stewart, of Perth. Many of these gentlemen have shown very helpful interest in the work of the Registry, some have not been able to spare much time for the task, but to all, on behalf of the College, the writer expresses cordial thanks. The Registry is indebted also in no small measure to the steadfast assistance of the College Secretary, Mr. H. G. Wheeler, and his staff, Miss N. C. Andrew and Miss A. Oldham.

The deaths from hydatid disease as recorded in hospitals is not tabulated, as it does not give a time index of the mortality, because a considerable proportion of hydatid patients leave hospital uncured and die in their own homes. The mortality rate for cases inside and outside of hospitals as estimated in New Zealand by the Government Statistician is approximately 14% to 15%.

Another point worth mentioning is that about 30% of the hydatid cases treated in New Zealand hospitals are readmissions for recurrences or complications.

If Australian figures are investigated they would probably be very similar.

L. E. BARNETT,
Hydatid Registrar-in-Chief.